Northern Jefferson County Transportation Infrastructure Study

Draft—2006

Prepared for:

Jefferson County and Montana Department of Transportation

Prepared by:

GreatWest engineering

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Jefferson County Transportation Study Committee Members

Tom Lythgoe, Commissioner, Jefferson County
Ken Weber, Commissioner, Jefferson County
Chuck Notbohm, Commissioner, Jefferson County
Ben Sautter, Road Supervisor, Jefferson County
Lee Alt, Butte District Traffic Engineer, Montana Department of Transportation
Carol Strizich, Planner, Montana Department of Transportation
Bill Lloyd, Engineer, Great West Engineering
Jeremiah Theys, Engineer, Great West Engineering

List of Preparers

The Transportation Group of Great West Engineering, Inc., Helena, Montana prepared this study. The following members of our firm were major contributors to this study or helped prepare the document:

Daniel McCauley, PE, Principal-In-Charge
Bill Lloyd, PE, Transportation Group Manager
Jeremiah Theys, EI, Transportation Engineer
Jim McGowan, Senior Planner
Jason Knopp, PE, Transportation Engineer
April Carter, Project/Marketing Coordinator
Stephanie Reinig, Engineering Intern

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1. Introduction and Background

The Northern Jefferson County Transportation Infrastructure Study is intended to serve as a guide for the Jefferson County Commission and Road Department when anticipating future infrastructure improvements within the study area and their associated costs. The planning document evaluates the capacity of the transportation system, both motorized and non-motorized, using current and future traffic volumes. A substantial amount of effort was dedicated toward projecting future growth and development through the 20-year (2025) planning horizon of this study. The growth and development estimates were used to forecast traffic volumes and identify future needs of the transportation system.

This planning document is intended to identify the problems associated with the various modes of transportation used in the study area, and recommend improvements necessary to meet current and future demands. The improvements range from simple signing recommendations to the construction, or reconstruction, of roads necessary to relieve existing problems and account for future growth.

The study addresses the current condition of the roads within the study area through the implementation of a Pavement Surface Evaluation and Rating (PASER) system for both paved and gravel-surfaced roads. The resulting road inventory provides a snap-shot of current road conditions and allows for the planning and budgeting of future maintenance and upgrade projects.

1.1. Project Background

The northern region of Jefferson County has undergone substantial population growth and development over the past two decades ending in the study year of 2005. The region focused on by this study, commonly referred to as the South Hills area, has experienced a significant increase in residential construction that has resulted in heightened traffic volumes on the local infrastructure. The impact that the proposed new South Helena Interchange project will have on an already strained transportation system prompted the Jefferson County Commission to approach the Montana Department of Transportation (MDT) in the spring of 2005. Jefferson County requested MDT assistance in undertaking a comprehensive transportation planning effort for the South Hills area. MDT recognized the impact that the new interchange, in combination with current and future growth, could place on the existing system and agreed to participate in the planning effort. Great West Engineering was selected by the Montana Department of Transportation and Jefferson County in June, 2005 to prepare the infrastructure study.

The South Hills area of Jefferson County and adjacent areas toward Helena, East Helena, and Montana City have experienced steady growth in the form of residential developments. However, the South Hills area offers very little in the form of employment, resulting in travel patterns that indicate a heavy reliance upon jobs within the City of Helena and its immediate fringe areas. Socio-economic conditions such as this can place heavy stresses on the collectors and intersections in and around the study area during peak traffic periods. This often results in higher traffic volumes on local roads as well; however, the rural nature of the study

area will tend to discourage the use of alternate routes that may occur in a more urban environment. The planning and mitigation measures necessary to accommodate this situation are a primary focus of this document.

The recent completion and approval of the Interstate 15 Corridor Final Environmental Impact Statement and Section 4(f)/6(f) Evaluation was a key factor in the undertaking of the South Hills study. The I-15 EIS outlines the preferred alternatives necessary to accommodate growth along the entire corridor stretching from the Montana City interchange on the south to the Lincoln Road interchange on the north. A key recommendation of the EIS was the construction of the new South Helena Interchange just north of the Jefferson County line. This caused concern among area residents in regard to the potential for increased traffic volumes and the associated effect on local road capacities. The traffic forecasts and recommendations set forth in the I-15 EIS were incorporated into this document.

The transportation planning effort for the South Hills study area was coordinated through a Transportation Coordinating Committee (TCC) consisting of the County Commission, County Road Superintendent, Montana Department of Transportation representatives, and Great West Engineering. Members of the TCC were active at key points during the planning process to comment on the findings and recommendations outlined in the study.

1.2. Study Area

The study area for this project was predicated on the rapid development experienced in the northern portion of Jefferson County and the need to identify existing and future improvements within this area. The boundaries for the study area consist of Old State Highway 282 (Frontage Road) to the east, the Jefferson County line to the north and west, and Jackson Creek Road along the south. The study area boundary is shown in Figure **1-1**. Lewis and Clark County was not included in the study area, but consideration has been incorporated into the population growth projections to include residential and commercial development occurring along the Lewis and Clark County line.

For the purpose of this study, Jackson Creek road was not analyzed for future roadway improvements and growth. Incorporating Jackson Creek Road into the study area would require the boundary to be expanded to the south to include development taking place along the south side of Jackson Creek Road.

1.3. Transportation Planning Goals

The end result of the transportation planning process is to provide the County with a guide for anticipating future projects necessary to improve transportation infrastructure within the study area. The study will identify deficiencies within the current system and prioritize recommended improvements such that the County can foresee upcoming improvement projects and budget for the associated costs. The planning process analyzes available funding options and their application to the various projects outlined in the study. Jefferson County and MDT agreed

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SCALE: 1" = 1760'

FIGURE 1-1
STUDY AREA

upon numerous goals as the primary focus of the Northern Jefferson County Transportation Infrastructure Study:

- Identify the needs of the existing transportation system through comprehensive data collection and traffic forecasting.
- Identify appropriate funding mechanisms and formulate an implementation plan for the recommended improvements in the study area.
- Provide adequate opportunity for public involvement throughout the development of the transportation study.
- Evaluate the impact that the South Helena Interchange will have upon traffic volumes and travel patterns in the study area.
- Prepare population growth and development trends and create estimated growth projections for use in forecasting future traffic volumes.
- Recommend improvements to transportation infrastructure necessary to accommodate future traffic demands.
- Review needs of non-motorized transportation users and recommend improvements necessary to accommodate and promote bicycle and pedestrian traffic.
- Provide recommendations for a safe and efficient transportation system that respects the rural, residential nature of the South Hills area.
- Identify roads and intersections with high accident rates and propose improvements to increase the safety of the traveling public.
- Identify a future transportation network to support increased growth over the 20-year planning horizon.

1.4. Public Involvement

Public involvement was a key component in the preparation of the Northern Jefferson County Transportation Infrastructure Study. The objectives of this component were to integrate issues and comments identified by the public into the design approach. The methods that were used to solicit public input included: Public meetings, questionnaires, news releases and the formation of a Transportation Coordinating Committee.

The first public meeting was held on October 11, 2005. The primary focus of the meeting was to inform the public about the study and gather any comments and concerns about transportation problems in the study area. To generate input from the public, comment forms were made available to allow input on specific concerns and suggest potential solutions or remedies. A majority of the key issues and concerns generated from the public fall into the following categories:

- Road Conditions
- Traffic Speeds
- Emergency Services
- Funding
- Bicycle and Pedestrian traffic

A questionnaire was handed out during the public meeting to solicit input on a few

specific issues. Figure 1-2 through Figure 1-8 summarize public sentiment on these issues.

Newspaper advertisements were used during the preparation of this study to generate interest in the project and invite the public to participate in the public meetings.

Two additional public meetings are scheduled during the preparation of this study. A public meeting will be held when the draft study is available to the public and another is scheduled when the final study is complete.

A Transportation Coordinating Committee was established to review and comment on the specific findings and project recommendations outlined within the study. This group met several times throughout the preparation of the study. The group consists of individuals representing the County Commission, County Road Department, Montana department of Transportation, and Great West Engineering.

Figure 1-2 Getting to and Leaving the Study Area

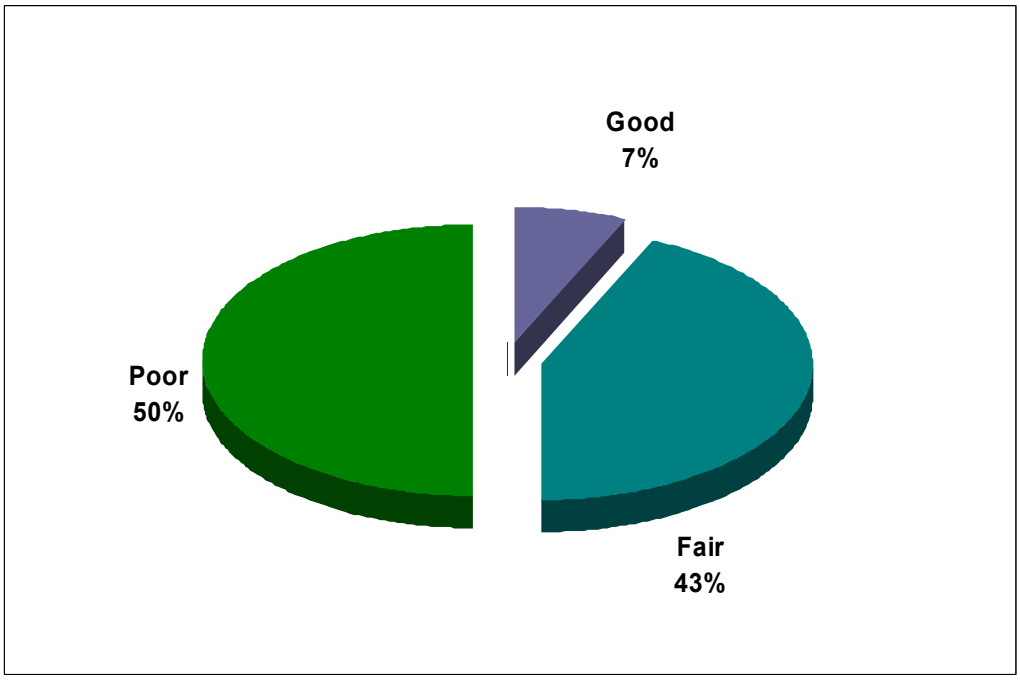


Figure 1-3 Signing Within the Study Area

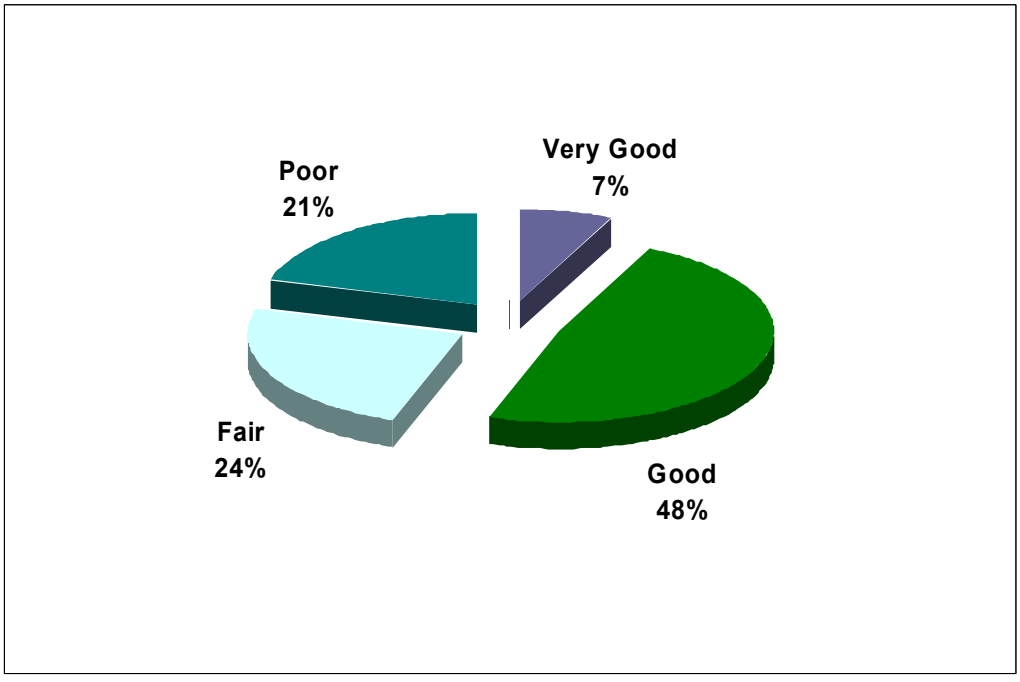


Figure 1-4 Driving Around in the Study Area

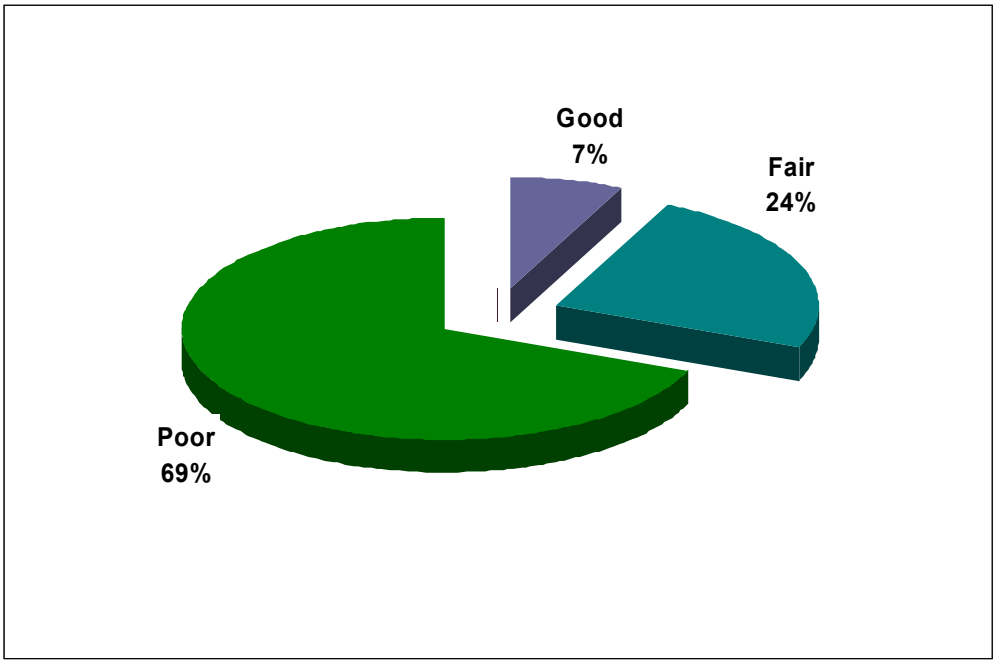


Figure 1-5 Traffic Congestion in the Study Area

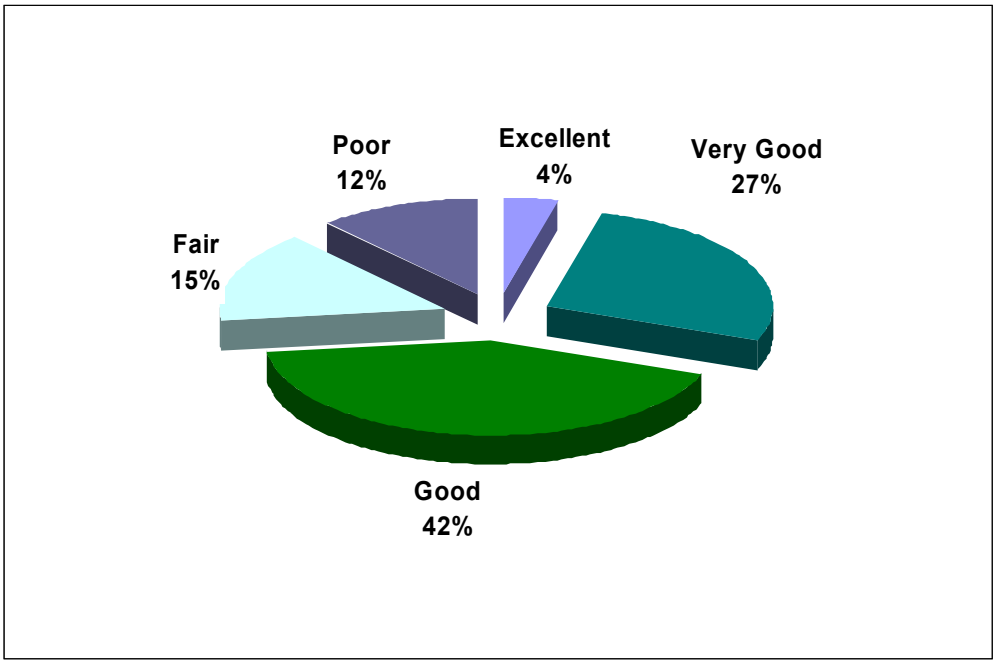


Figure 1-6 Road Conditions within the Study Area

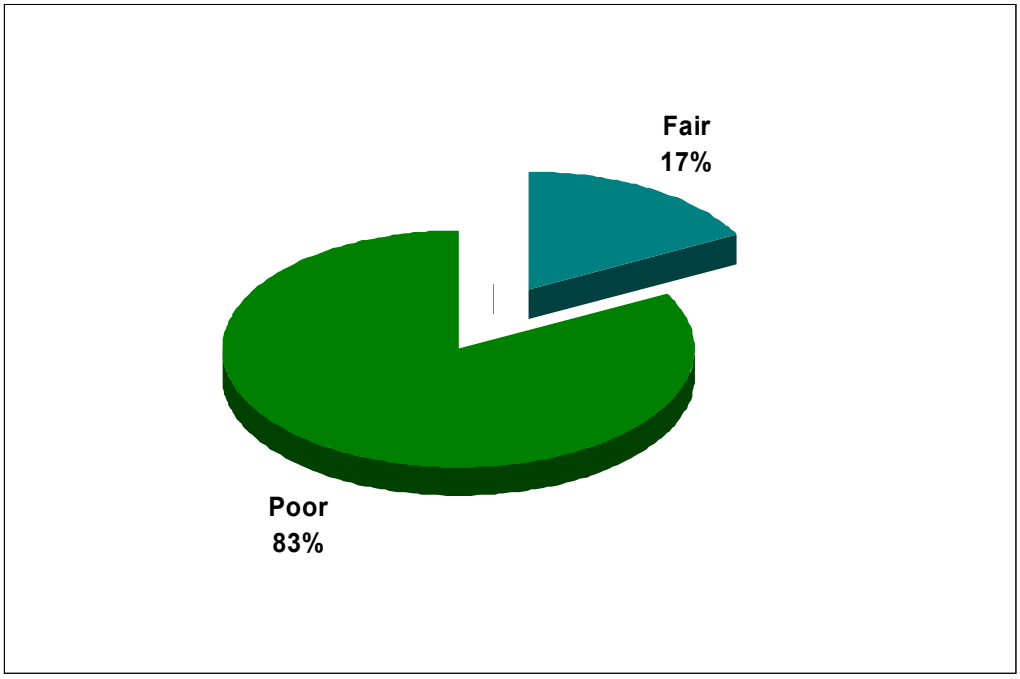


Figure 1-7 Impacts on Surrounding Neighborhoods

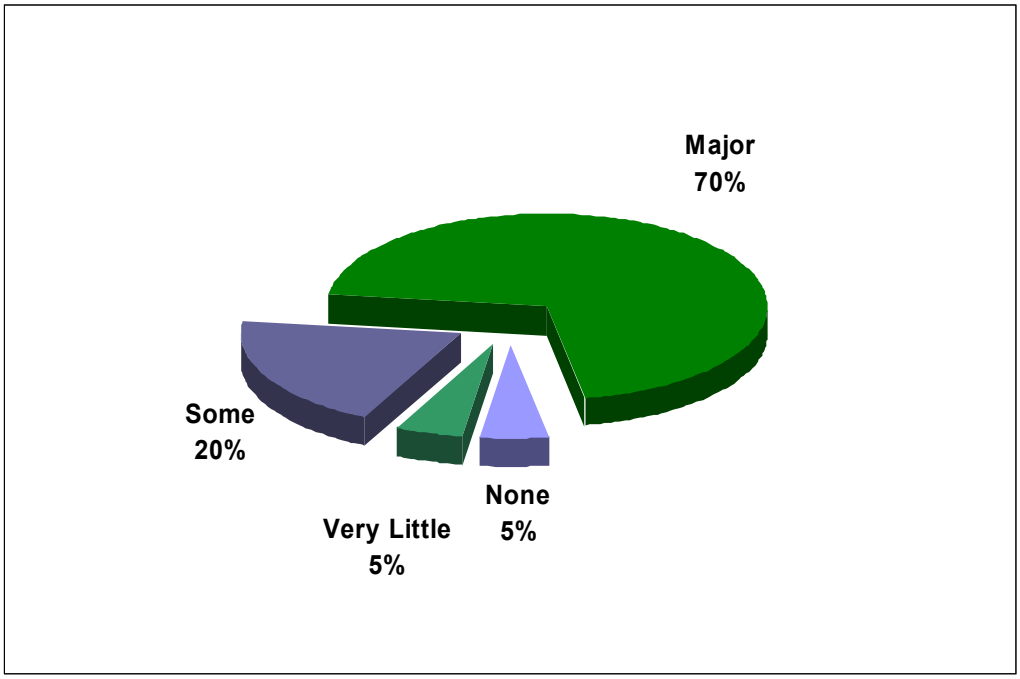
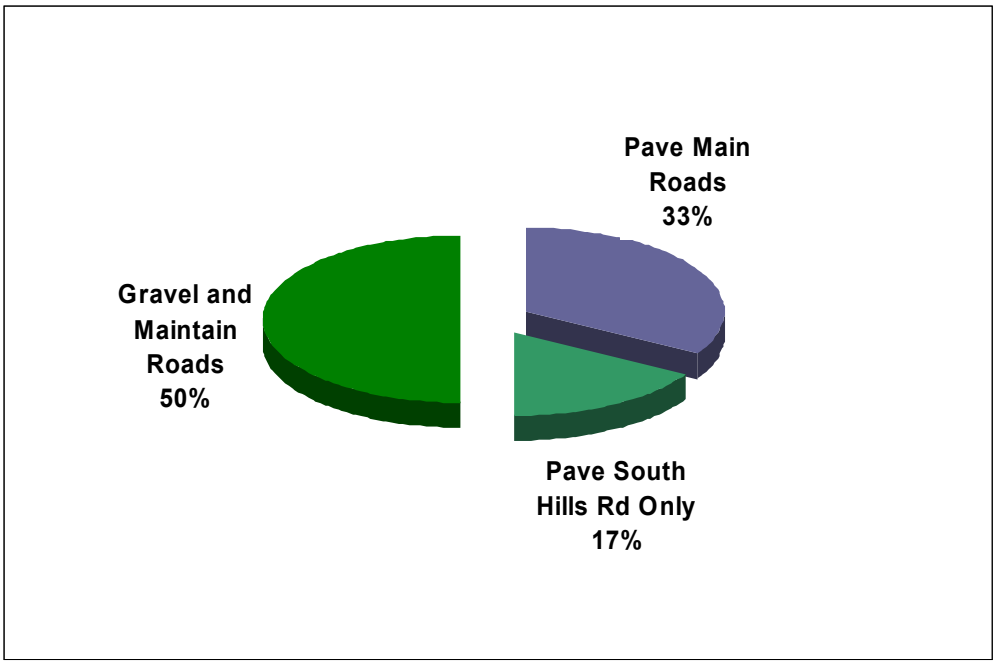


Figure 1-8 Improvements to Roads



2. Existing Conditions

2.1. Existing Road System

To aid in the evaluation of the existing road system, the roads within the study area were separated into three general types and defined by their functional classifications.

The first road type involves private/public access roads which consist of all roads that are privately owned and maintained. For the purpose of this study, only South Hills Drive and North Quarry Road were evaluated as these two road segments may be incorporated into the County road system in the future. The second and third road types consist of gravel and paved roads that fall under County jurisdiction and are maintained by the County. Old State Highway 282 is an exception to this as it is a County paved road but is maintained through the study area by the Montana Department of Transportation. The existing conditions of the County roads were evaluated and are discussed further in this section.

The two functional classifications of roads within the study area are collectors (Minor and Major) and local roads. The only major collector found in the study area is Old State Highway 282. Holmes Gulch Road, Capitol Drive, and South Hills Road are all minor collectors within the study area. All other roads in the study area are considered local roads. The Jefferson County Road Standards define these classifications as principal arterial, minor arterial and local roads. Principal arterials are all major collectors and minor arterials are minor collectors.

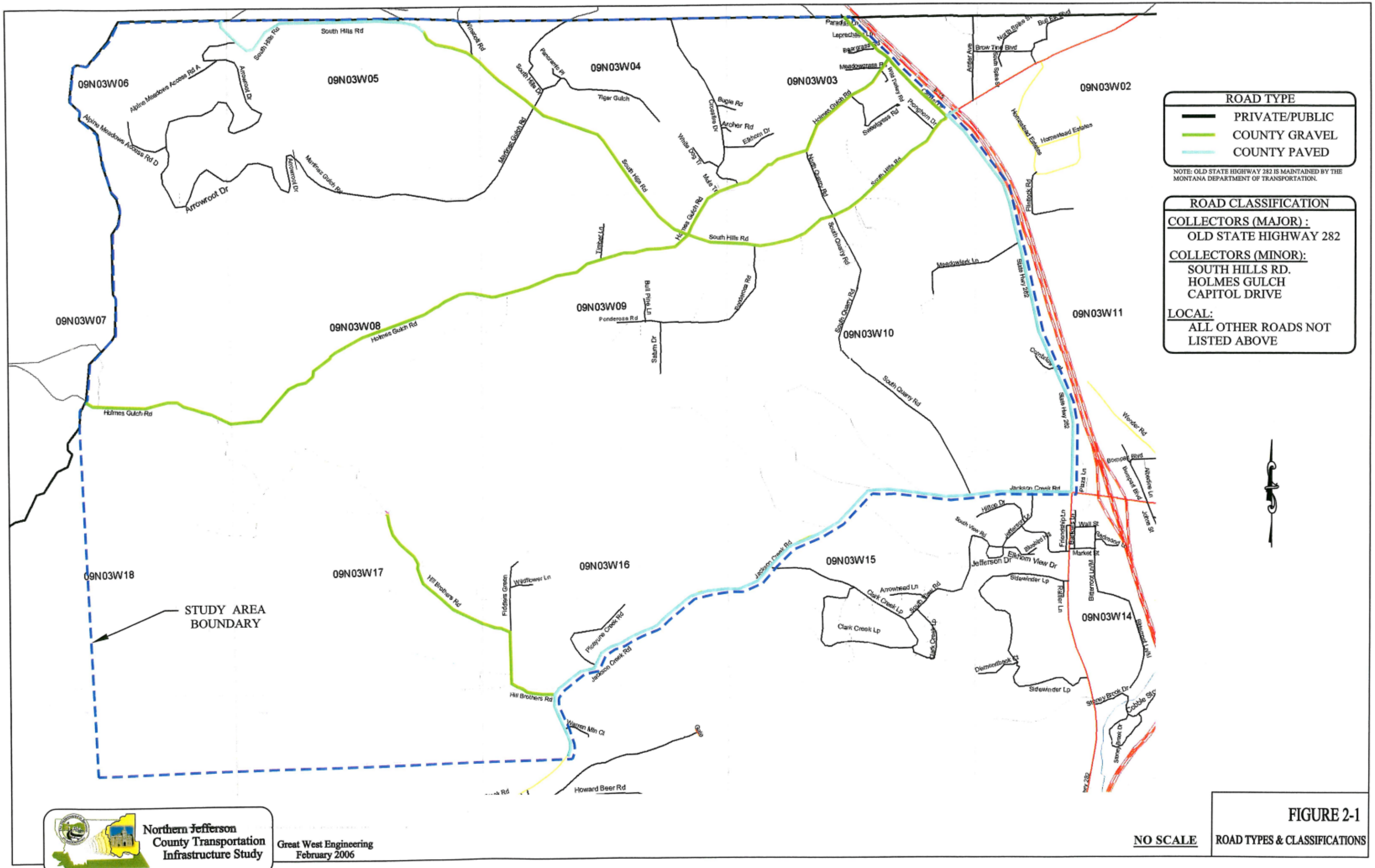
The Jefferson County Road Standards are included as an appendix to this document. The road types and classes are depicted graphically in Figure **2-1**.

The Jefferson County Road Department assigns levels of maintenance to each road segment based on the road classification designated for that facility. The maintenance levels used by Jefferson County are A, B, C, D, and Z. Level A is the first response and top priority maintenance level, level B is regularly scheduled maintenance, level C is infrequent or annual maintenance, level D is maintenance as required but no regularly scheduled maintenance, and level Z is not maintained. Typically, major collectors receive a maintenance level A or B, minor collectors receive a maintenance level of B or C, and local roads vary from B, C, D or Z.

Road Network

The major roads analyzed under this study were South Hills Road, Holmes Gulch Road, Capitol Drive, South Hills Drive, North Quarry Road, Hill Brothers Road, and Old State Highway 282. All other roads within the study area were not individually evaluated with the exception of South Quarry Road. This section of road is discussed further in Section **5** as a future transportation link through the study area.

South Hills Road is an east-west, two-lane gravel minor collector that connects to Old State Highway 282 on the east and Lime Kiln Road to the west. A portion of South Hills Road near the Lewis and Clark County line is paved. The posted speed limit is 25 miles per hour (mph).



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NO SCALE

FIGURE 2-1

ROAD TYPES & CLASSIFICATIONS

Holmes Gulch Road is an east-west, two-lane gravel minor collector that runs through the center of the study area. The speed limit on Holmes Gulch Road is not signed on the eastern portion of the roadway. West of South Hills Road the posted speed limit is 25 mph.

Capitol Drive is a two-lane, north-south gravel minor collector. Capitol Drive connects Old State Highway 282 with Colonial Drive in Lewis and Clark County. The posted speed limit is 25 mph.

South Hills Drive is a two-lane, north-south local private/public gravel road that extends north from South Hills Road into Lewis and Clark County. The posted speed limit on South Hills Drive is 25 mph.

North Quarry Road is a two-lane, north-south local private/public gravel road that connects to Holmes Gulch Road on the north and South Hills Road to the south. This road is not posted for speed.

Hill Brothers Road is a two-lane, north-south local gravel road that intersects with Jackson Creek Road. The posted speed limit is 25 mph.

Old State Highway 282 is a two-lane, north-south paved major collector that connects Montana City to East Helena. The posted speed limit through the study area is 70 mph.

The County roads in the study area were evaluated and rated based on current road conditions. The inspection and evaluation of the roads were based on guidelines set forth by the Transportation Information Center, University of Wisconsin-Madison. The University of Wisconsin-Madison has developed the "Pavement Surface Evaluation and Rating: PASER Manual, Gravel Roads," which ranks gravel roads on a scale of one to five, one being the worst and five being the best and the "Pavement Surface Evaluation and Rating: PASER Manual, Asphalt Roads," which ranks paved roads on a scale of one to ten, one being the worst and ten being the best available roadway. The road evaluations rated conditions based on the following criteria:

Gravel Roads

- Crown
- Drainage
- Gravel layer
- Surface Deformation
- Surface Defects
- Ride Quality

Paved Roads

- Surface Defects
- Surface Deformation
- Cracks
- Patches and Potholes
- Ride Quality

Field evaluation and data collection took place in October, 2005. Each road was driven, measured for length, and evaluated based on a windshield/walking survey. Table **2-1** shows the PASER rating for the existing road conditions within the study area. The existing County gravel roads have an average PASER rating of 2.7. This value equates to roadways that are in poor to fair condition and require maintenance. The required maintenance on the County gravel roads may include regrading, drainage ditch maintenance, adding gravel, surfacing and shaping the roadway crown. The average rating for the paved roads

was 6.5. These roads are generally in good condition and require minimal maintenance to extend the life of the pavement. The maintenance required may include minor crack and patch repair, chip sealing, and minor overlays on poor or failed sections.

Table 2-1 - PASER Rating on County Roads

Road Section	PASER Rating
South Hills Road (Highway 282 to Skyline Drive)	2.0
South Hills Road (Skyline Drive to Quarry Road)	2.4
South Hills Road (Quarry Road to Holmes Gulch Road)	2.5
South Hills Road (Holmes Gulch Road to Pavement)	2.5
South Hills Road (Pavement to County Line)	5.9
South Hills Drive (South Hills Road to County Line)	2.5
North Quarry Road (Holmes Gulch Road to South Hills Road)	3.3
Holmes Gulch Road (Capitol Drive to Sweetgrass Road)	2.3
Holmes Gulch Road (Sweetgrass Road to South Hills Road)	2.6
Holmes Gulch Road (South Hills Road to Mule Trail)	2.4
Hill Brothers Road (Jackson Creek Road to End of Road)	4.1
Old State Highway 282 (South Hills Road to Jackson Creek Road)	7.1
Average Rating (Gravel Roads)	2.7
Average Rating (Paved Roads)	6.5

The existing condition of Capitol Drive, from Old State Highway 282 to the County line, was not evaluated as this road is scheduled to be reconstructed in 2006-2007 as part of the South Helena Interchange project. This project is discussed further in Section 6.

2.2. Current Traffic Volumes

Current traffic volume data was used in this study to model existing road conditions, analyze current traffic flow, and make recommendations for future improvements. Traffic volume data was collected by Great West Engineering utilizing traffic counters that recorded average daily traffic (ADT), traffic speeds, peak hour volumes, and percentage of traffic distribution at select locations within the study area. Additional data was collected by field inspections during peak hour traffic flow in September, 2005. Traffic volume records from the Montana Department of Transportation were also utilized in this analysis. The existing volumes are shown graphically in Figure 2-2.

2.3. Current Traffic Control

Currently there are no signalized intersections within the study area. There is one four-way stop at the intersection of South Hills Road and Old State Highway 282. All other intersections are currently two-way stop controlled.

2.4. Current Intersection Levels of Service (LOS)

Current turning movement data was collected by Great West Engineering in September of 2005. Traffic movements were counted from 4:00 p.m. to 6:00 p.m. at several intersections within the study area. The data was used to analyze the P.M. peak hour traffic operations and determine a Level of Service (LOS) at each intersection.

The Level of Service (LOS) is a quality measure used to describe the operational conditions, physical characteristics, and functionality of an intersection. The LOS categorizes the conditions of the intersection based on speed, travel time, traffic interruptions, as well as the motorists' perception of conditions, comfort, and convenience. The LOS is designated by letters ranging from A to F, where LOS A represents the best operating condition and LOS F

CURRENT TRAFFIC VOLUME

- 0-100 ADT
- 100-200 ADT
- 200-300 ADT
- 300-400 ADT
- 400-500 ADT
- 700-800 ADT
- 1000-2000 ADT

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FIGURE 2-2
CURRENT TRAFFIC VOLUME

represents the worst condition. When evaluating unsignalized intersections, the LOS is calculated for those movements that must either stop for or yield to oncoming traffic and is based on average control delay for the particular movement. Control delay is a measure of all the delay attributable to traffic control measures, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Four major intersections within the study area were evaluated to determine the peak hour traffic movement LOS:

- South Hills Drive - South Hills Road
- Holmes Gulch Road - South Hills Road
- Homes Gulch Road - Capitol Drive
- South Hills Road - Old State Highway 282.

The LOS for each intersection was analyzed using the SYNCHRO computer software program. This program analyzes and optimizes the operation of individual intersections, as well as a network of intersections. Table 2-2 shows the LOS for each of the intersections analyzed in this study.

Table 2-2 - Existing Intersection Level of Service (LOS)

Intersection	LOS	Control Delay (sec)
South Hills Drive - South Hills Road	A	3.2
Holmes Gulch Road - South Hills Road	A	4.2
Holmes Gulch Road - Capitol Drive	A	2.0
South Hills Road - Old State Highway 282)	A	7.5

The LOS shown is the average LOS of each leg of the intersection. The control delay, measured in seconds per vehicle, is reported as the worst delay within the intersection.

2.5. Truck Traffic

Field observations have shown a higher than average percentage of truck traffic along some of the roads in the study area. Traffic distribution data was gathered as part of the traffic volume collection done in September of 2005. The traffic distribution data separates the traffic volumes into various classes of vehicles ranging from cars and trucks to buses and 3 axle truck trailer combinations. For the purpose of this study, truck volumes were lumped together to include tractor-trailer combinations, dual axle and heavy single axle trucks, recreational vehicles, and buses.

Table 2-3 shows the percentage of truck traffic compared to total traffic volume at select locations throughout the study area.

Table 2-3 - Percentage of Trucks Compared to Total Traffic Volume

Road Location	%
South Hills Road (East of Holmes Gulch Road Intersection)	8.6
South Hills Road (Near Lime Kiln Road)	7.5
South Hills Drive (Near Lewis and Clark County Line)	11.7
Holmes Gulch Road (North of South Hills Road Intersection)	12.3
Holmes Gulch Road (South of South Hills Road Intersection)	6.3
Capitol Drive (North of Highway 282 Intersection)	16.1
Old State Highway 282 (South of Capitol Drive Intersection)	13.8

In rural settings similar to the study area, the average percentage of truck traffic varies from 6 to 10 percent. As shown in the table above, truck traffic is significantly higher than average on most roads in the study area. The overall increase in truck traffic can be attributed to the recent spike in development

and construction occurring in and around the study area. Currently there is a major development under construction adjacent to the City of Helena water tank which is impacting Capitol Drive as heavy trucks are hauling from Montana City to the development site.

There is a significantly high percentage of truck traffic in the southeast boundary of the study area due to the Ashgrove commercial gravel pit located in this area. As the pit is expected to be in operation well into the future, the high percentage of truck traffic can be expected to continue for the duration of planning horizon.

3. Transportation Demand Forecasting

3.1. Introduction

The existing population of Jefferson County and the distribution and characteristics of population centers are key indicators of the type and extent of services that are needed to serve the community today, and when compared to recent and past trends, land development demands and the need for transportation facilities of the future can be more accurately anticipated. An awareness of recent population trends provides a valuable guide for planning, budgeting, and financing decisions.

Population forecasts are used to determine future needs for infrastructure improvements, land development, housing and community facilities. As changes in population occur, the impact of these changes must be evaluated and provisions made to accommodate the needs of the community, including the impact on the local road system.

The following discussion includes a reference to population data showing trends for Jefferson County indicated by U.S. Census historical data and for the North Jefferson County study area northwest of Montana City. Census population and housing figures for the study area were derived from census block level data and compared to a dwelling unit count that was developed in a build-out analysis for North Jefferson County as part of the Jefferson County Growth Policy. The census data includes a reference to corresponding figures for cities in the County to facilitate a general comparison of trends in the rural vs. incorporated areas.

As shown in Table 3-1, the trend for Jefferson County since 1970 has been for an overall increase while the cities of Boulder and Whitehall have fluctuated slightly with both experiencing a loss since 1990. A large portion of the population gain in the rural area of the County can be attributed to the subdivision activity in the Montana City area over the last 15 years. According to the Census Bureau, the Montana City CDP had 2,094 persons at the time of the last census. Since population in the CDP area was not summarized in previous census years, the trend or extent of recent growth in the area is not apparent in the table below.

Table 3-1 - Population by Census Year

	1970	1980	1990	2000
Jefferson County	5,238	7,029	7,939	10,049
Montana City CDP	-	-	-	2,094
Boulder	1,342	1,441	1,316	1,300
Whitehall	1,035	1,030	1,067	1,044

Source: US Census

The population represented by the Montana City CDP data includes only a portion of the study area in question, generally the east one fourth near the interstate, as well as all of the Montana City area west of the highway and south to the Clancy CDP. More complete population figures for the study area were obtained through census block level data, Department of Revenue records for residential land, and estimates used in the Jefferson County Growth Policy.

3.2. Existing Population

Data for Census Blocks included within the study area shows that there were approximately 364 persons living in the area

at the time of the 2000 Census. Some interpolation was necessary for Census Block 1006 since it includes some area south of the study area boundary. As shown in Table 3-2, the 2000 Census study area population corresponds to 126 housing units or 2.89 persons per unit.

Table 3-2 - Population Estimate 2000 Census

Census Blocks	Study Area Population
1000 – 1005	80
1006 (Part in Study Area)	160 (238=Block Total)
1007 – 1009	124
Total Study Area	364
Total Housing Units = 126 Person/Dwelling Unit (D.U.) = 2.89	

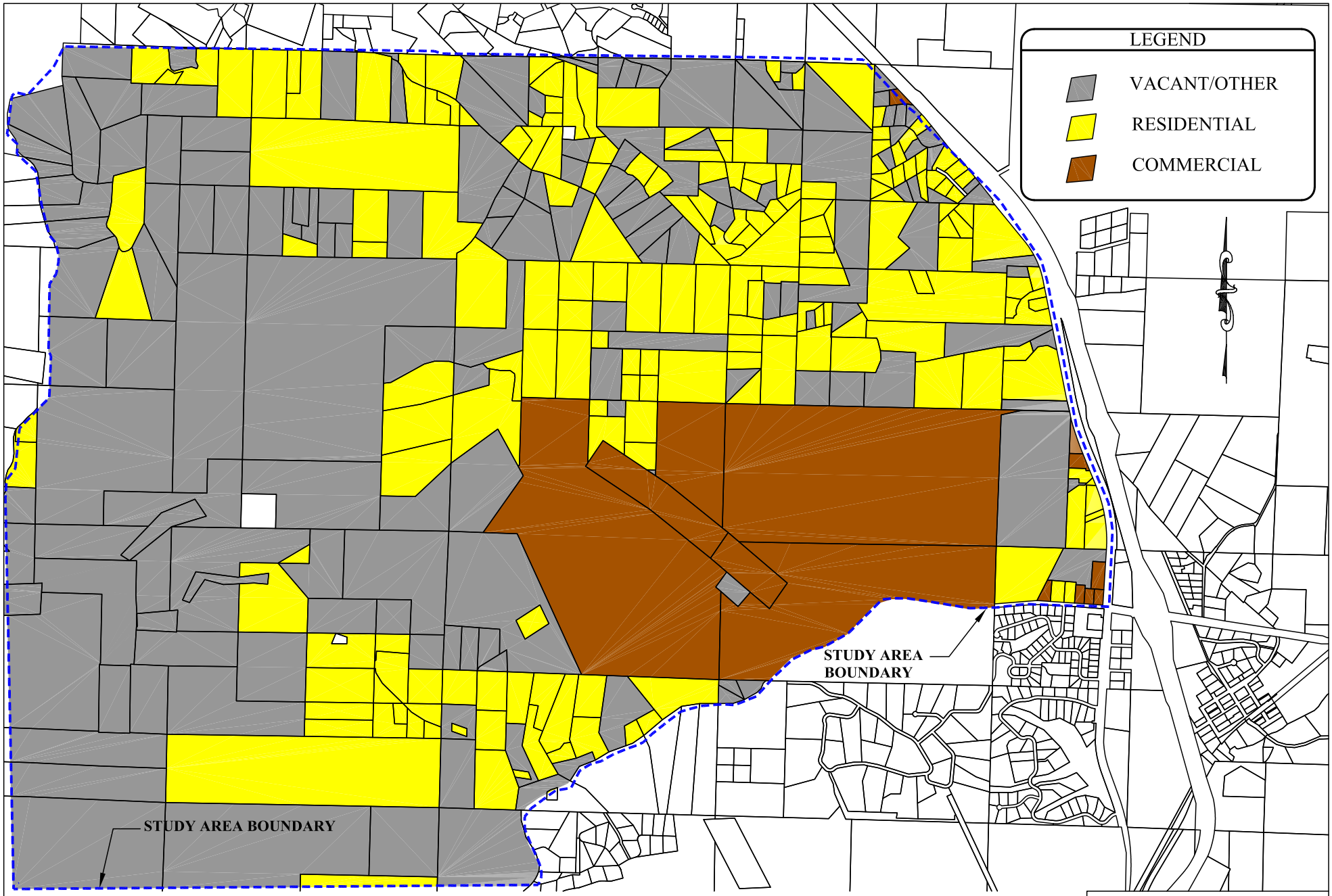
Additional information regarding the population within the study area was obtained from the Growth Policy adopted in 2003 for the County. In order to estimate changes taking place since the census, the Build-out Analysis for the North Jefferson County area was used as a reference. This study was completed in 2000 and incorporated estimates for the number of dwelling units in 54 sections at the north end of the County. The data was summarized by section and included estimates for the existing situation and the potential for number of units at total build-out. Considerations for growth potential included the effect of existing zoning for permitted density and adjustments to figures based on natural constraints to development. Using data from the buildout survey for sections included in the study area, there were a total of 205 dwelling units in 2000. The total number of additional dwelling units at total build-out is estimated at 805 as shown in Table 3-3.

Table 3-3 – 2000 Transportation Plan Study Area Build-out Analysis*

	Number of Dwelling Units		
Section No.	Existing (2005)	Potential	Total (2025)
3	24	181	205
4	51	49	100
5	62	147	209
6	0	24	24
7	1	9	10
8	2	50	52
9	8	201	209
10	15	124	139
11 (Part)	(25) 10	(16) (5)	41 (15)
14 (Part)	(99) 0	(567) (0)	666 (0)
15 (Part)	(16) 0	(26) (0)	42 (0)
16 (Part)	(14) 10	(12) (5)	26 (15)
17	22	-14 (0)	8 (22)
18	0	10	10
21 (Part)	4 (0)	8 (0)	12 (0)
	205	805	1,010

*Table does not include the entire build-out study area
(See Figure 3-4 for section number locations within the study area)

As a means of validating the existing dwelling unit estimate obtained from the build-out survey, Department of Revenue data (CAMA) for parcels in the area was mapped to show the distribution, size, and occupancy status of parcels. The data allowed for a count of residential and commercial parcels and whether or not the parcel was included in the vacant classification in the state data base. Parcel information derived from the state Cadastral Mapping Project is shown in Figure 3-1 for the study area. Current residential, commercial and vacant land classifications are shown on the map. A count of existing residential parcels showed that there are approximately 200 occupied residential land units in the area. When compared to the build-out survey estimate of 205 dwelling units, this number is slightly low, especially considering that some housing has been



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NO SCALE

FIGURE 3-1
PARCEL CLASSIFICATION

added since the build-out survey estimate was done. For estimating purposes, we will use 240 dwelling units for the 2005 study area estimate. This is a conservative figure that is higher than the CAMA data summary, but lower than the projected 2005 estimate using the build-out survey. Using the census block average density figure of 2.89 persons per dwelling, the population is 650 persons for the study area in 2005.

3.3. Population Projection

Census estimates for Jefferson County and the incorporated vs. rural areas are shown in Table **3-4**. The County estimates show a steady increase for both the incorporated and rural areas from 2000 through 2004 and that a steady growth is forecast for the entire County from 2005 through 2025. The census projected trend reflects an average growth rate of 2% per year during this period for Jefferson County. This compares to an average growth rate of 2.7% per year for the County from 1990 to 2000.

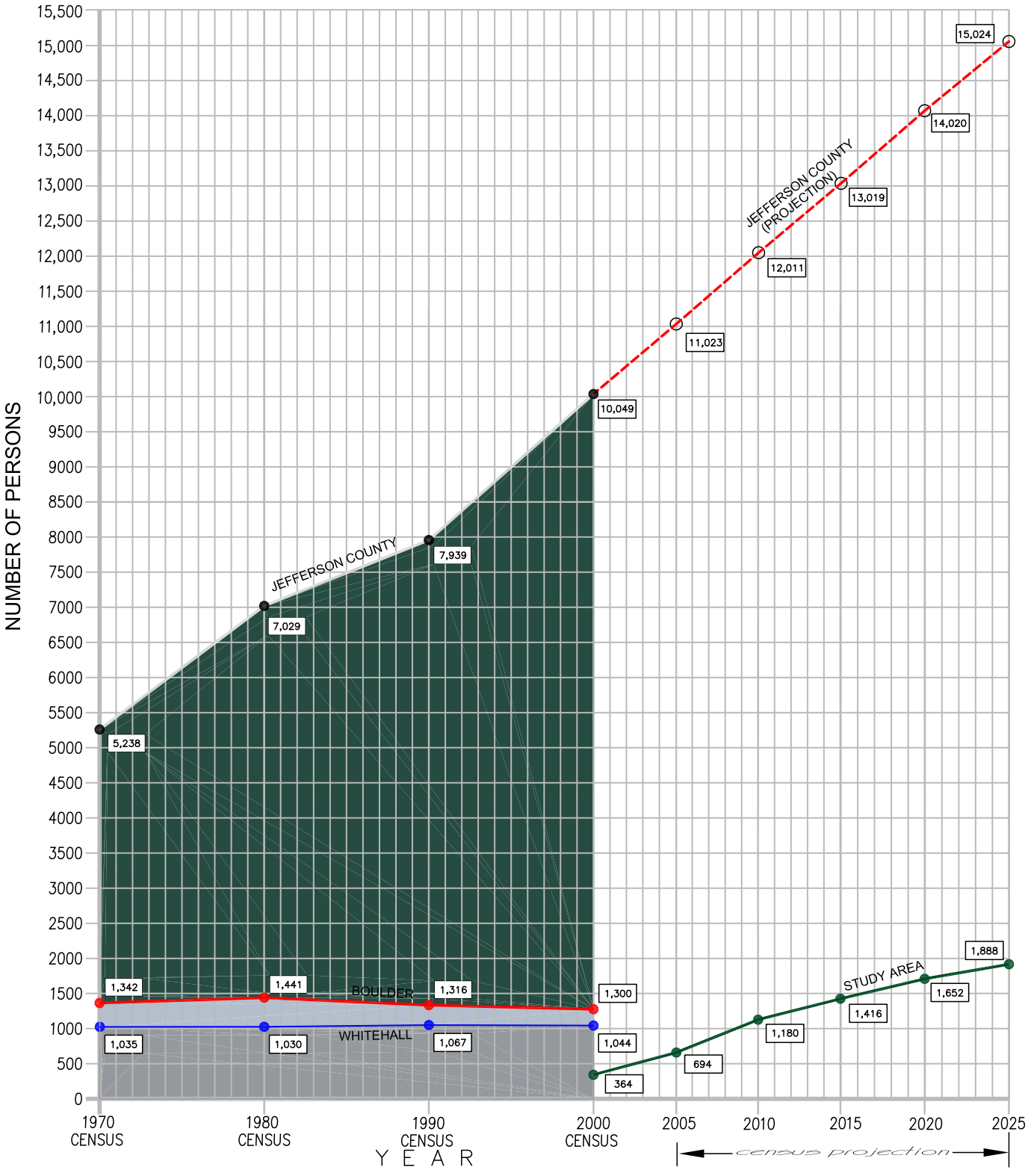
Table 3-4 - Jefferson County Population 1990-2025

	Census 1990	Census 2000	(2004)	% Change (2000-2004)	(2005)	(2010)	(2015)	(2020)	(2025)
Jefferson County	7937	10,049	(10,857)	(8.0%)	(11,023)	(12,011)	(13,019)	(14,020)	(15,024)
Boulder		1,300	(1,398)	(7.5%)					
Whitehall		1,044	(1,134)	(8.6%)					
Balance of County		7,705	(8,325)	(8.0%)					

Source: US Census

The number of housing units in the Transportation study area in North Jefferson County from the 2000 Census to 2005 increased by an average of approximately 14% per year over the period while the rural area of the County was estimated at an average of 8% per year overall by the census. According to the estimate for potential build-out in the area (see Table **3-3**), there could be as many as 805 additional dwelling units in the area when it is completely developed subject to existing zoning and natural constraints. However, it is not likely that this situation would occur given the fact that rural areas are rarely developed to full potential as allowed by zoning density. It is more likely that the growth in this area will continue at its current pace for a limited period of time and grow at a more normal rate approaching the County average after that. The current growth rate of 14% per year in the study area appears to be a reasonably conservative estimate to use for the next five years. The projection from 2010 to 2025 should be a considerably lower growth rate because of the influence of an expected decline in the rate of natural increase and uncertainty regarding future migration patterns. Since this area of the County has clearly been under greater pressure for development than any of the rural areas to the south, the long term growth will be estimated at an average of 4% per year for the study area, or double the expected growth rate for the County.

The population projection for Jefferson County is shown in Table **3-5** and Figure **3-2**. The table shows the projection based on recent growth patterns as previously discussed. The estimate shows an overall growth of 1,194 persons for the 20 year



NO SCALE

FIGURE 3-2
POPULATION PROJECTION

period since 2005 to a level of 1,888 persons. The trend shown assumes a continuation of growth for the study area with an initial growth rate near current levels. Conditions resulting in a more dramatic increase in the long term are possible within the planning period, but are not included in this projection.

Table 3-5 - Population Projection

	Population				
	2005	2010	2015	2020	2025
Study Area	694	1,180	1,416	1,652	1,888

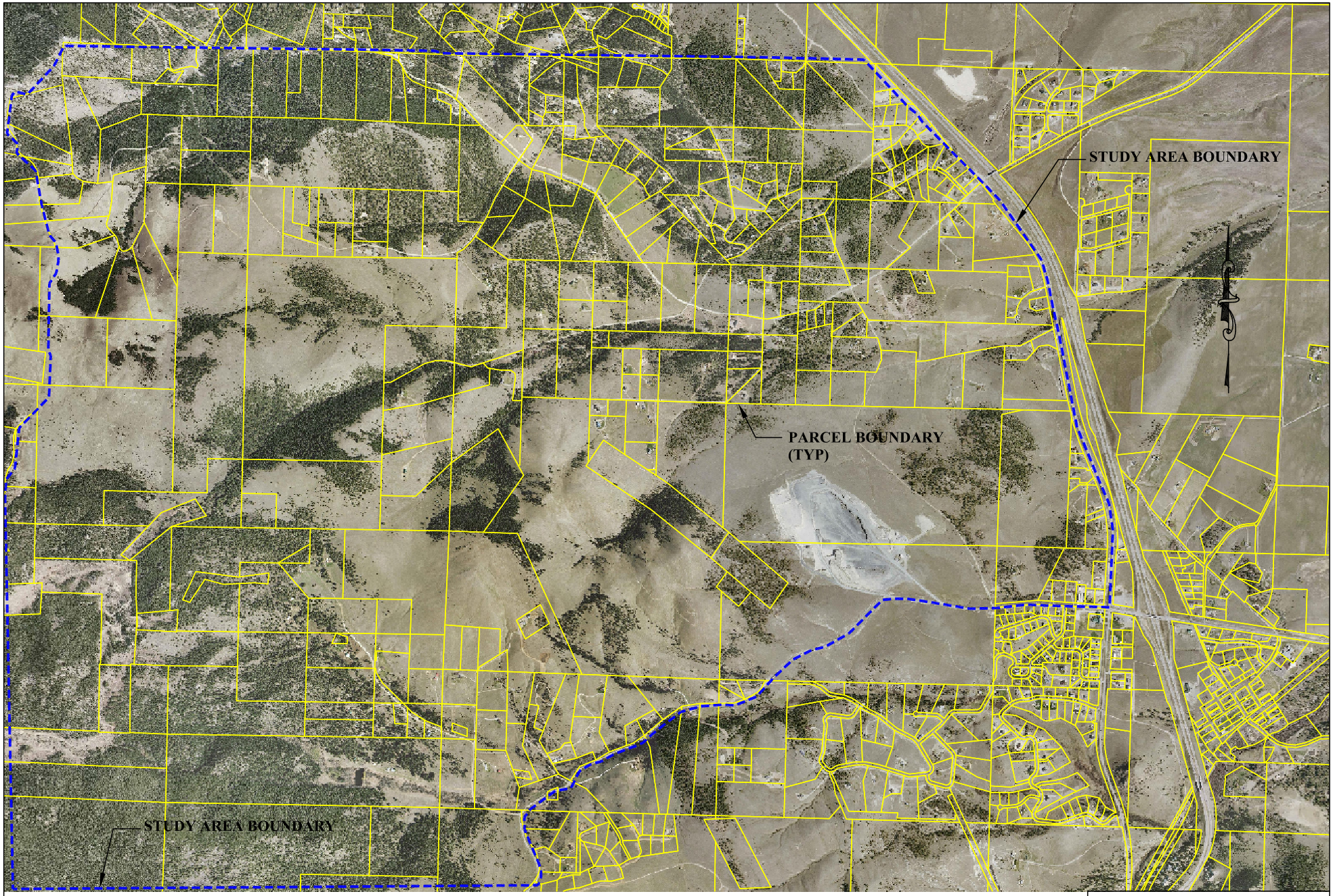
Source: Great West Engineering, Inc.

Figure 3-3, 3-4, and 3-5 show the existing parcel layout, zoning districts, and topography in the study area.

3.4. Traffic Volume Projections

Traffic volumes were forecasted using the two levels of growth discussed in Section 3.3. The growth level was projected at 14% through 2010 and 4% from 2010 to 2025. Engineering judgment was used to determine which roads could see the greatest increase in traffic due to future growth and development as well as planned transportation projects. The South Helena interchange is estimated to have the greatest impact on traffic volumes. Under this project, Capitol Drive will be improved and paved from the interchange, located just north of the county line, to Old State Highway 282. This project will significantly increase the volume of traffic on Capitol Drive as this will function as a major collector route. The traffic volume projections for the study area are presented in Figure 3-6 and Figure 3-7. These projections show that traffic volumes will increase significantly in the next 5 years on most collectors within the study area.

It should be noted that the traffic volumes shown on Figure 3-6 and Figure 3-7 are based on the existing road network and currently planned transportation projects. Effects of future transportation projects could significantly impact traffic patterns within the study area. Future transportation projects should be fully evaluated, prior to implementation, to define impacts to traffic volumes and effects to the road network.



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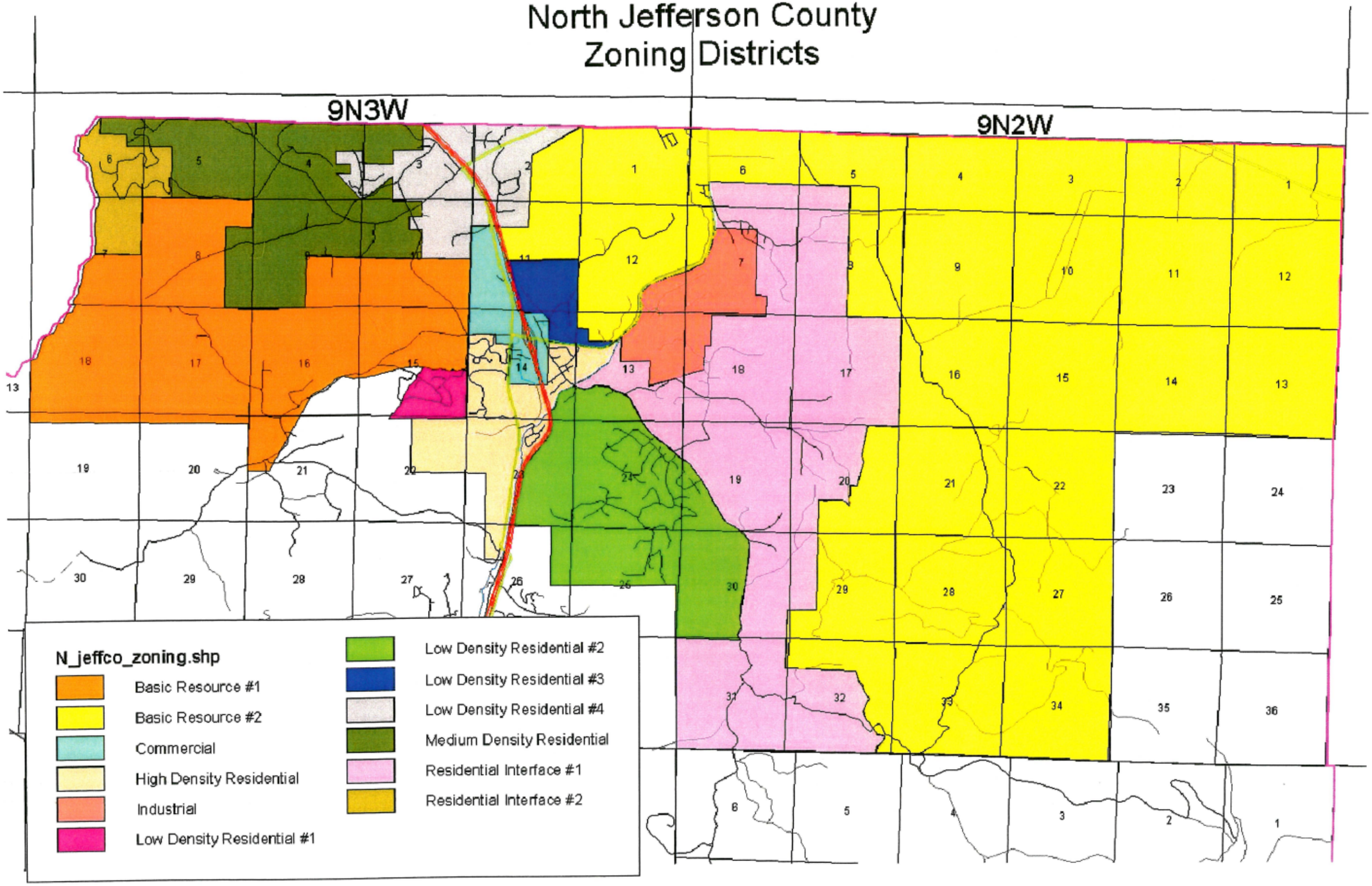
NO SCALE

FIGURE 3-3

PARCEL BOUNDARY

North Jefferson County
Zoning Districts



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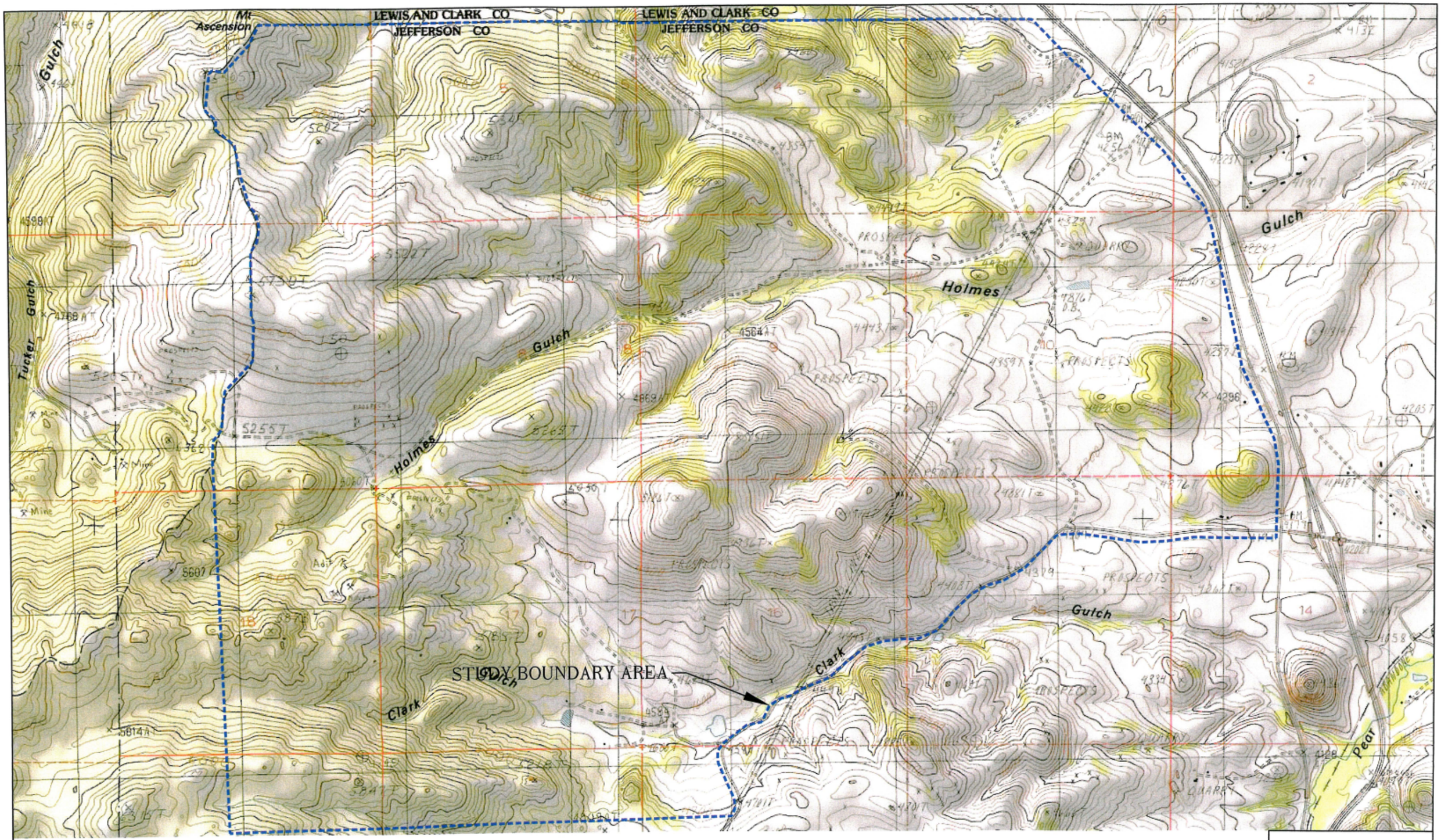
NO SCALE

FIGURE 3-4
ZONING



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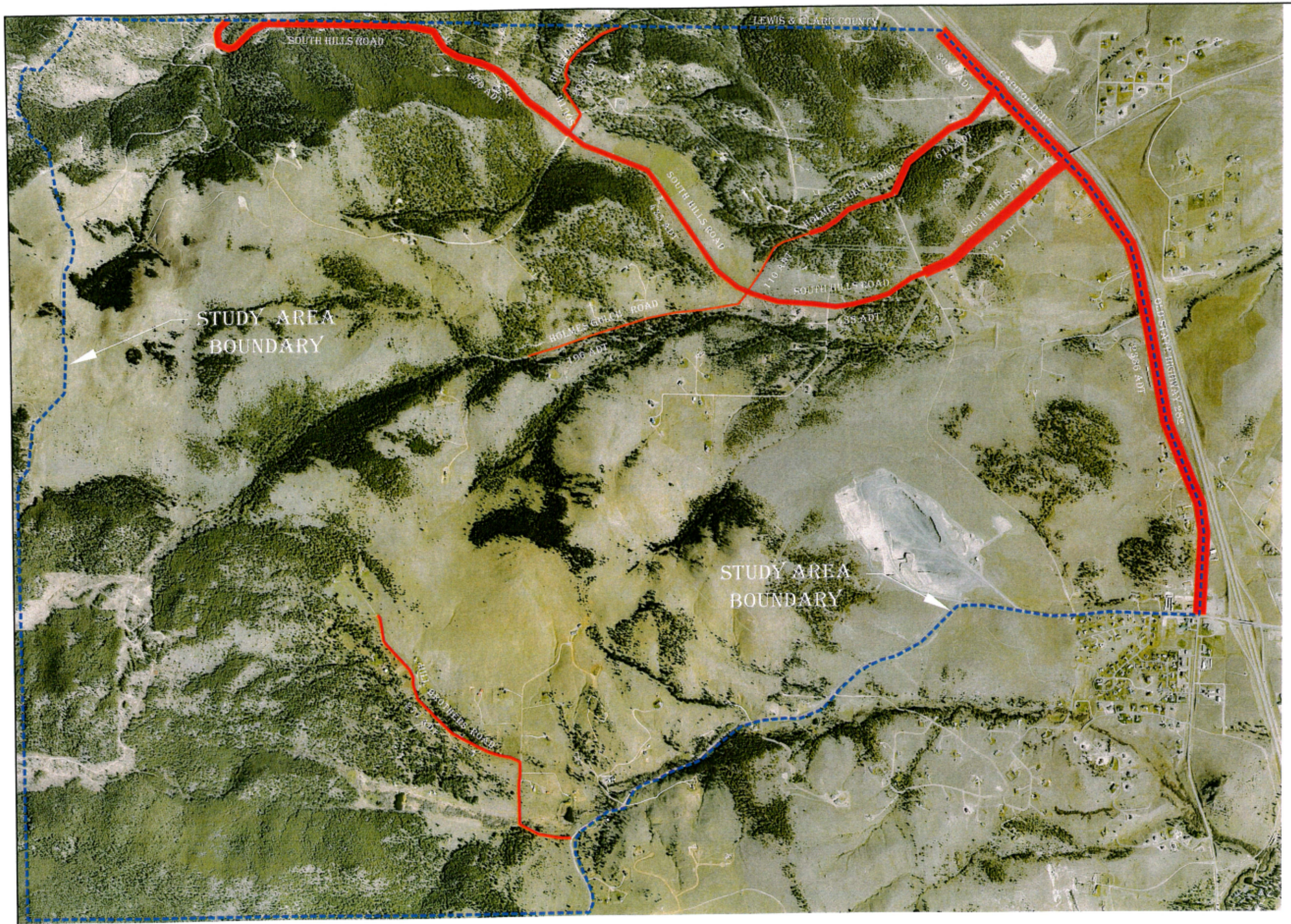
SCALE: 1" = 1760'

FIGURE 3-5
TOPOGRAPHY



2010 TRAFFIC VOLUME

- 100-200 ADT
- 200-300 ADT
- 400-500 ADT
- 600-700 ADT
- 900-1000 ADT
- 2000-3000 ADT
- 3000-4000 ADT

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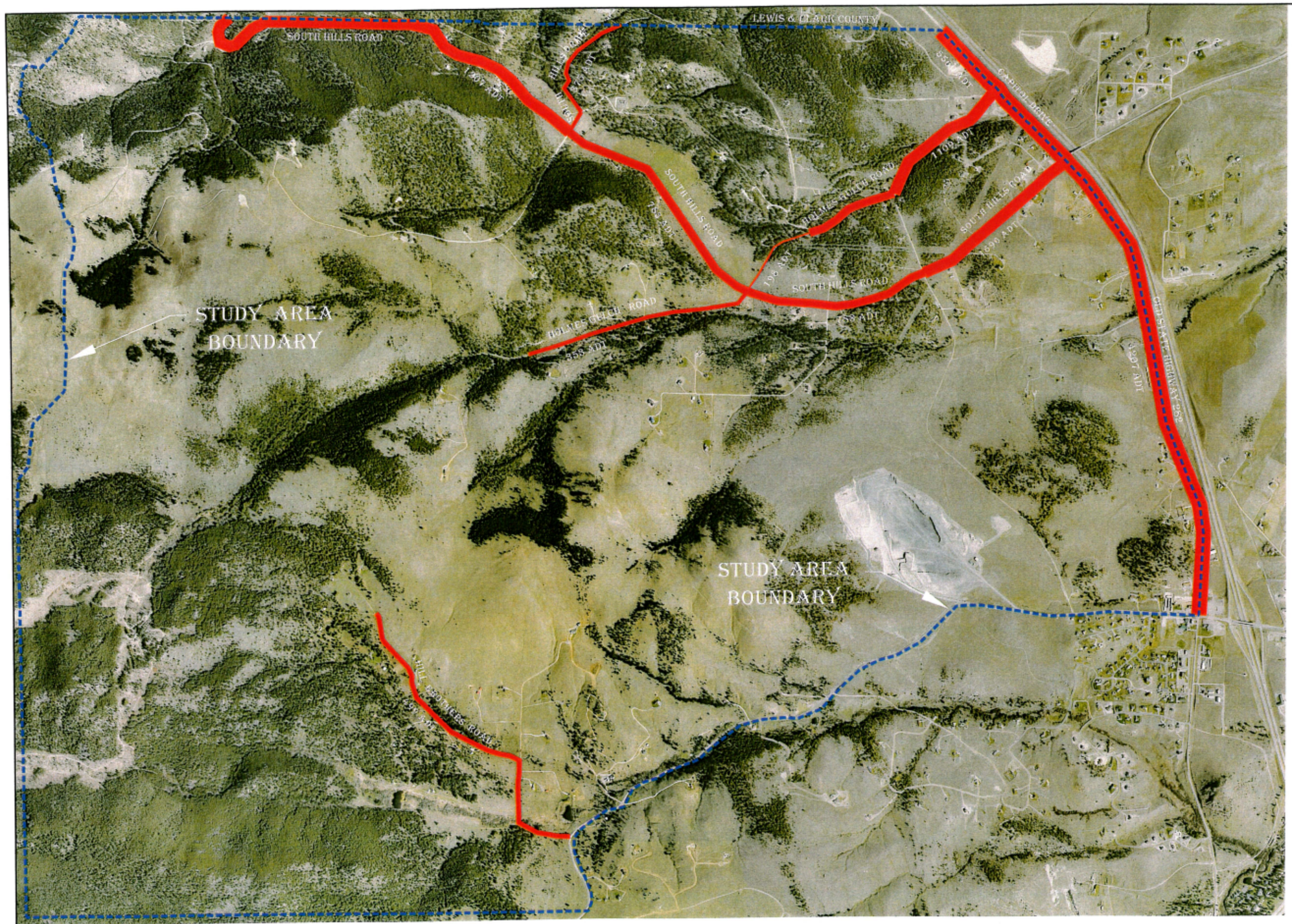
FIGURE 3-6
2010 TRAFFIC VOLUME



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SCALE: 1" = 1760'

FIGURE 3-7
2025 TRAFFIC VOLUME

4. Non-Motorized Transportation

This section of the study is dedicated to enhancement of the existing transportation network in the South Hills area through the implementation of non-motorized transportation, primarily in the form of pedestrian and bicycle paths. Currently, there are no trails in the study area dedicated solely for the purpose of walking and bicycling. Pedestrians and cyclists are forced to utilize roads primarily intended to serve motorized traffic resulting in potential safety and liability concerns.

The South Hills region is a popular recreation area for the City of Helena and adjacent residential developments. Hikers and cyclists are common sights on the road network throughout the study area, particularly during the summer and fall seasons. However, the rural nature of the area in combination with long distances to places of employment limits the amount of non-motorized utilitarian travel.

4.1. Obstacles Facing the Development of a Non-Motorized Travel System

The primary barrier to the progression of non-motorized travel within the study area is the lack of a trail network. While numerous hiking and bicycling trails originate within the South Hills locale, the infrastructure necessary to promote use of the trail heads is lacking. Pedestrians and bicyclists are forced to share the road with motorized traffic when navigating through the study area.

The rural nature of the region, coupled with the lack of paved roads, leads to the absence of sidewalks in and around the area. However, the construction of the South Helena Interchange and subsequent widening and paving of Capitol Drive and Colonial Drive will result in sidewalks adjacent to the roadway north of the County line.

The current signing does not delineate specific bicycle lanes and/or routes. However, most of the network consists of local roads and many recreationalists limit their activities to collectors such as South Hills Road, Holmes Gulch Road, Capitol Drive, and Old State Highway 282. Jackson Creek Road immediately south of the study area boundary, also sees high usage from pedestrian and bicycle traffic.

As previously discussed, most hiking and bicycling activities are enjoyed during the more temperate months from May through October. Non-motorized use drops significantly during the winter months as plowed snow constricts the shoulders and narrows the travel lanes, the road surface becomes muddy and the temperatures drop. Future development of non-motorized trails and paths would need to consider the maintenance and repair of the system.

4.2. ADA Compliance

The development of a non-motorized trail system would likely need to address the basic requirements of the Americans with Disabilities Act (ADA). The trails should provide sufficient access at intersections with roads as well as comply with ADA regulations relating to maximum grades and minimum widths. Given the rugged nature of the terrain, it is likely that the construction of any

new trails would require exceptions to ADA requirements.

4.3. Design Considerations

Bicyclists, particularly those within the study area, tend to follow the established routes for motorized travel out of necessity. Due to the inherent risks involved with assimilating bicycle traffic into predominantly motorized travel, it would be beneficial to establish a bicycle route system. While dedicated bicycle paths are not necessary on the local road network, it would be in the best interest of motorists and bicyclists alike if traffic could be separated on the collectors where traffic volumes and average speeds tend to escalate. As previously discussed, the majority of the bicycle use in the South Hills area is recreational in nature versus utilitarian. As such, the implementation of bicycle routes will have little impact on traffic volumes. The benefits of designated routes will come in the form of enhanced safety for non-motorized traffic and alleviation of traffic capacity concerns resulting from motorized vehicles encountering slower bicycle traffic.

4.4. Recommended Bicycle Routes

The following corridors are recommended for consideration in the development of recreational bicycle routes:

- South Hills Road, County line to Old State Highway 282
- Old State Highway 282, Jackson Creek Road to South Hills Road
- Jackson Creek Road, study area boundary to Old State Highway 282
- Capitol Drive, Old State Highway 282 to County Line

Figure **4-1** outlines the recommended Bicycle Route System. The system is designed to accommodate the current and future needs of non-motorized traffic. A primary objective when laying out the system was to provide continuous routes through the study area both in the east-west and north-south directions. The incorporation of a bicycle route along South Hills Road accomplishes the goal of an east-west conduit and would increase bicyclist safety. The construction of a bicycle route adjacent to Old State Highway 282 and Capitol Drive will allow for a physical separation of bicycle traffic from the high traffic volumes on these roads. The addition of a bicycle route along the south boundary of the study area adjacent to Jackson Creek Road will provide a safe conduit for non-motorized travel as future development causes traffic volumes to escalate in the area west of Montana City.

In order to promote continuity within the non-motorized transportation network, new paths should be constructed such that they integrate properly with adjacent trail systems. The South Helena interchange project involves the construction of a sidewalk adjacent to Capitol Drive north of the County line. The bicycle route recommended along the Capitol Drive corridor south of the county line should properly tie into the trail system constructed in Lewis & Clark County. The proposed bicycle routes adjacent to Old State Highway 282 and Jackson Creek Road should allow for a proper tie into the proposed roundabout located at the Jackson Creek Road/ Old State Highway 282 intersection. Consideration given to the continuity of the

non-motorized system during the planning and design phase will ensure a safe, effective network that will promote bicycle and pedestrian use throughout the study area.

4.5. Implementation

The initial step in implementing and constructing a non-motorized trail system within the study area involves the formation of a local trails working group. The working group would be responsible for soliciting input from local residents regarding pedestrian and bicycle travel networks. Input should also be solicited from open-space, bicycling, and hiking organizations. Organizations such as the Prickly Pear Land Trust have been instrumental in acquiring open-space in the areas adjacent to Helena's southern boundary and developing the trail network in this area. The County should also consider requiring developers of land adjacent to the recommended bicycle route corridors to address how their projects will expound upon the system.

Serious consideration should be given to non-motorized travel when evaluating future road improvement projects in the South Hills area. Incorporating pedestrian and bicycle travel into preliminary design can often lead to innovative solutions to constructing an area wide network. Constructing pedestrian and bicycle facilities in conjunction with larger road construction projects often proves to be a cost-effective means of adding to the non-motorized transportation system.

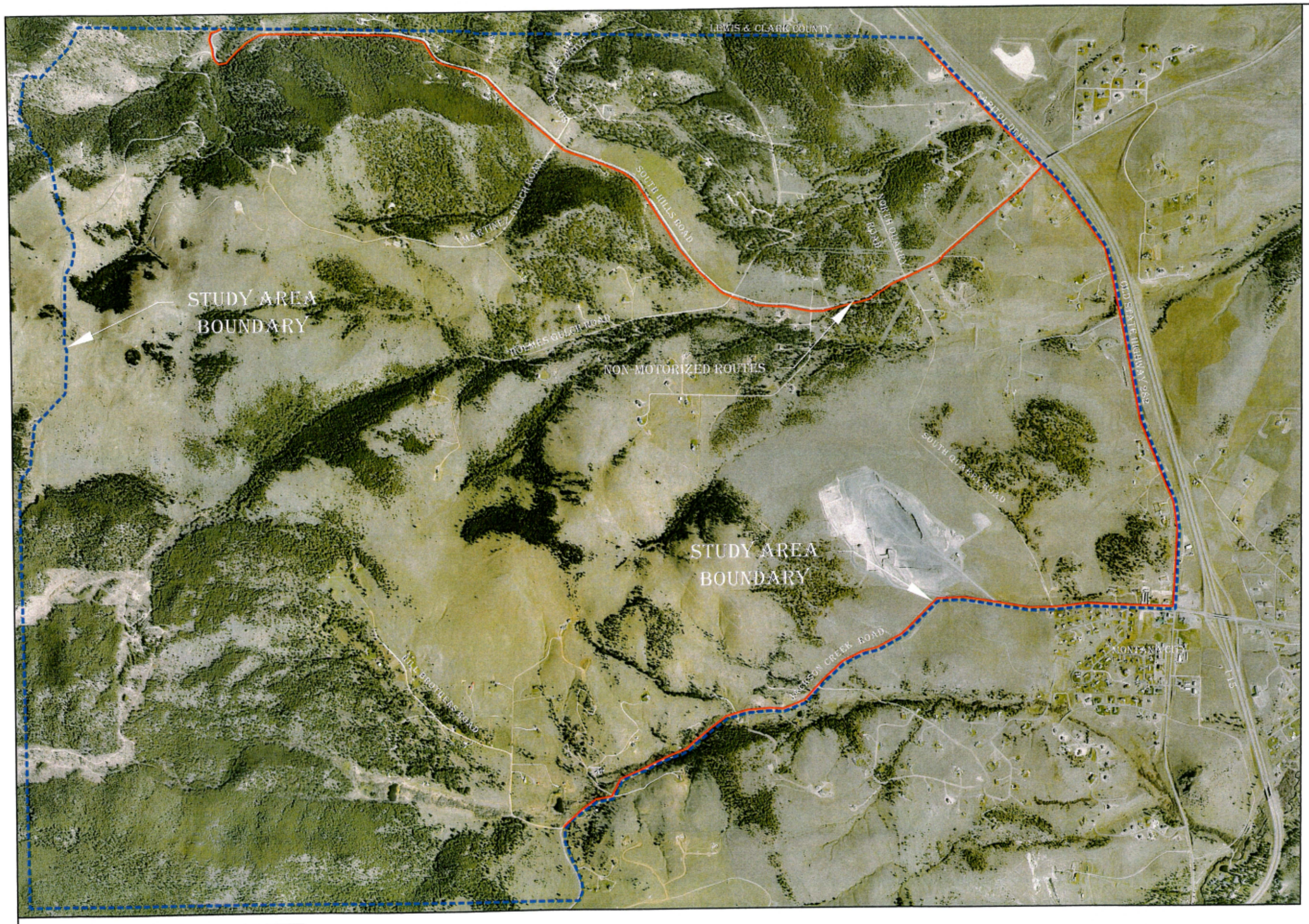
4.6. Maintenance

In order to promote the use of non-motorized routes throughout the South Hills area, the County must implement a system-wide maintenance policy. The policy should address issues such as the agency(s) responsible for maintaining the trails, maintenance standards, and reporting of maintenance requests. At a minimum the County should address the following concerns related to trail maintenance:

- Snow removal – Accumulations of snow can present safety concerns to pedestrians and bicyclists using the system. Removal of snow from the trails will also promote year-round usage of the system.
- Vegetation control – Trees and shrubs should be trimmed back from the trails in order to ensure adequate sight lines and reduce potential conflicts with trail users. Roots should be removed from the path surface to maintain a smooth traveling surface.
- Drainage – The trail system should be inspected on a regular basis for plugged culverts and other drainage related issues that may result in water collecting on the trail system.
- Repair and upkeep – The trails should be inspected regularly and repairs made as necessary to maintain a safe trail free from irregularities such as potholes, ruts, etc. The paths should be policed for litter and road debris on a regular schedule. The County may consider enacting a trail adoption program similar to the Adopt-A-Highway Program implemented by MDT as a means of controlling litter on the non-motorized trail system.

- Signing – The trails should be properly designated as non-motorized paths.

The recommended improvements proposed in this section are intended to enhance the safety of pedestrian and bicycle travel throughout the study area. The implementation of a non-motorized trail system will also enhance motorized travel through the reduction of traffic congestion caused by slower bicycle travel and pedestrian traffic. The proposed trail system will provide access to various hiking and bicycling paths originating in the area and encourage alternate means of transportation.



LEGEND

RECOMMENDED NON-MOTORIZED ROUTES

Northern Jefferson County Transportation Infrastructure Study

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SCALE: 1" = 1760'

FIGURE 4-1
RECOMMENDED NON-MOTORIZED ROUTES

5. Problem Identification

The overall road network was analyzed to define current problems associated with road condition, volume vs. capacity, transportation network connectivity, and intersection Level of Service (LOS). The road network was also analyzed for the year 2010 and 2025 traffic volumes to determine future problems and maintenance issues associated with growth and development in the study area.

5.1. Road Condition

The majority of the existing County roads are in poor condition and many are in need of improvements. The existing County gravel roads have an average PASER rating of 2.7. This value equates to roadways that are in poor to fair condition and require maintenance. The average rating for the County paved roads is 6.5. These roads are generally in good condition and require minimal maintenance to extend the life of the roadway. The PASER ratings calculated are based on current traffic volumes. As development and growth occur in the study area these roads will continue to deteriorate resulting in lower ratings.

Maintenance and improvements are warranted on the majority of roads within the study area to improve the overall condition as well as safety. The current condition of the gravel roads is affecting traffic traveling on these roads as well as residential access in the study area. Many of the existing roads are in poor condition and have developed excessive potholes, washboards, and ruts. The current road condition is affecting the response time of emergency services as well as school bus traffic accessing the study area. This is a major concern to people living in or around the South Hills area. Recommended improvements necessary to improve the existing road network are discussed further in Section 6.

The majority of roads in the study area are surfaced correctly to meet current traffic volumes with the exception of South Hills Road and Capitol Drive. South Hills Road from Quarry Road to Old State Highway 282, and Capitol Drive from Old State Highway 282 to the County line are presently over the recommended hard surfacing trigger specified by the County Road Standards. Future traffic volumes dictate that a majority of the roads will require hard surfacing during the planning horizon. Recommended improvements are discussed further in Section 6.

5.2. Volume vs. Capacity

The capacity of the existing road network was analyzed to determine whether improvements or expansion should be implemented to accommodate future traffic volumes. The overall capacity of a given roadway is directly related a number of factors such as the number of travel lanes, traffic speed, road condition, access points, road alignment, vehicle type, and land uses. All of the roads analyzed in the study area have sufficient capacity to facilitate the 2025 projected traffic volumes with the exception of two intersections in the study area. The South Hills Road – Old State Highway 282 and the Holmes Gulch Road – Capitol Drive intersections decrease in overall condition to a level of service F by the year 2025. The decrease in LOS is a result of insufficient capacity at the intersections which cause

significant delays in traffic flow. These intersections are discussed further in Section **5.4**.

5.3. Transportation Network

The study area was analyzed to evaluate the current transportation network and determine where additional corridors may be developed to encourage traffic flow throughout the study area.

Currently, South Hills Road and Holmes Gulch Road are the only east-west networks within the study area. These corridors extend through the center of the study area and have good connectivity for traffic traveling east or west into locales outside of the study area. Old State Highway 282 in conjunction with Capitol Drive is the only north-south network in the study area. This network functions sufficiently to connect traffic in the eastern side of the study area. The study area does not currently have a good north-south transportation corridor in the western portion.

The existing roads within the study area were evaluated to determine where future transportation networks could be located. Based on current zoning, residential growth, and the topography in the area, most areas are not conducive to new road construction. Much of the western portion of the study area is very steep and rugged and would be difficult and expensive to develop a road network. Environmental considerations may hinder the development of new road corridors in the western regions of the study area as well. Much of the eastern portion of the study area is zoned residential and is developing quickly. As significant development has occurred, acquiring right-of-way for a new road corridor in this area may not be cost effective.

South Quarry Road could potentially serve as a north-south connector through the study area. It is currently an unmaintained primitive gravel private/public road. With significant improvements, this road could serve as a connector from South Hills Road to Jackson Creek Road near Montana City. Jefferson County should monitor development and growth along this road segment to allow for future expansion and upgrades to the road.

5.4. Intersection Level of Service

Four major intersections within the study area were evaluated to determine the peak hour traffic Level of Service (LOS) for existing as well as future traffic movements. The peak hour traffic volume data used in the analysis is shown in Figure **5-1** and Figure **5-2**. The intersections evaluated include:

- South Hills Drive - South Hills Road
- Holmes Gulch Road - South Hills Road
- Homes Gulch Road - Capitol Drive
- South Hills Road - Old State Highway 282.

		2010 Growth Rate =	14.0%	2025 Growth Rate =	4.0%
Intersection	Direction	Movement	2005 Existing Peak Hour Volumes	2010 Peak Hour Volumes	2025 Peak Hour Volumes
1. SOUTH HILLS DR. / SOUTH HILLS RD.	NB	LT	2	4	7
		THRU	3	6	11
		RT	1	2	4
	SB	LT	1	2	4
		THRU	3	6	11
		RT	3	6	11
	EB	LT	1	2	4
		THRU	16	31	56
		RT	1	2	4
	WB	LT	2	4	7
		THRU	8	15	27
		RT	2	4	7
2. HOLMES GULCH/SOUTH HILLS RD.	NB	LT	1	2	4
		THRU	5	10	18
		RT	1	2	4
	SB	LT	1	2	4
		THRU	3	6	11
		RT	2	4	7
	EB	LT	4	8	14
		THRU	13	25	45
		RT	3	6	11
	WB	LT	6	12	22
		THRU	6	12	22
		RT	1	2	4

		2010 Growth Rate =	14.0%	2025 Growth Rate =	4.0%
Intersection	Direction	Movement	2005 Existing Peak Hour Volumes	2010 Peak Hour Volumes	2025 Peak Hour Volumes
3. HOLMES GULCH/CAPITOL DR.	EB	LT	15	37	117
		THRU	-	-	-
		RT	8	20	63
	SB	LT	-	-	-
		THRU	42	144	457
		RT	12	41	130
	NB	LT	12	41	130
		THRU	62	213	676
		RT	-	-	-
4. SOUTH HILLS RD / HIGHWAY 282	EB	LT	15	34	142
		THRU	8	18	75
		RT	14	32	134
	WB	LT	29	25	104
		THRU	4	9	38
		RT	11	66	276
	SB	LT	9	31	98
		THRU	23	79	251
		RT	22	76	241
	NB	LT	28	64	267
		THRU	24	55	230
		RT	29	66	276

The LOS analysis evaluates the condition of an intersection and provides an operational evaluation expressed as a letter designation ranging from A to F. The LOS letter designation A represents the best conditions and equates to very little or no delay, sufficient capacity, and smooth overall operation. The LOS letter designation F represents the worst overall condition and equates to unreasonable delays and poor intersection operation. LOS B or C are both considered acceptable levels of service and typically do not require improvements to the intersection. A LOS of D represents an intersection that has average control delay of 25 to 35 seconds per vehicle which means the intersection is at or beyond capacity and improvements are recommended. Table **5-1** shows the intersection LOS for current and future operating conditions.

Table 5-1 - Intersection Level of Service (LOS)

Intersection	Current LOS	2010 LOS	2025 LOS
South Hills Drive - South Hills Road	A	A	A
Holmes Gulch Road - South Hills Road	A	A	A
Holmes Gulch Road - Capitol Drive	A	A	F
South Hills Road - Old State Highway 282	A	A	F

As shown in Table **5-1**, the existing intersections function sufficiently through the 2010 growth projection analysis. The South Hills Road – Old State Highway 282 and the Holmes Gulch Road – Capitol Drive intersections decrease in overall condition to LOS F by the year 2025. The decrease in LOS is a result of insufficient capacity in the intersections which causes significant delays in traffic flow. To meet future traffic capacity demands, these intersections will require upgrades and enhancements to improve traffic congestion through the intersections. Upgrades that should be evaluated include expanding the intersections with additional through lanes and or turning lanes, or controlling traffic with either a roundabout or a signalized intersection. As traffic volumes increase to reflect the 2025 projected volumes, each intersection should be analyzed to determine which upgrade best meets the needs of the area.

The LOS of each intersection studied in this report may be impacted should traffic flow patterns or traffic volumes change significantly within the study area. Should significant changes be witnessed at any of these sites, the intersections should be reevaluated to determine if improvements are warranted.

5.5. Accident Analysis

An accident analysis was conducted on the major roads within the study area. Five years of accident data records (2000 – 2004) were obtained from the Montana Department of Transportation for use in the analysis. The analysis evaluated each road segment to determine whether there was a high accident history, the general accident characteristics, and to identify probable road deficiencies.

Accident rates were calculated for each road segment to determine whether the roadway has a significantly high percentage of accidents. The accident rates are based on the number of accidents compared to the number of vehicle miles driven in a given time period. The rates are typically expressed as the number of accidents per million vehicle miles traveled. Table **5-2** shows the number of

accidents and the accident rates for the major road segments in the study area.

Table 5-2 - Accident Analysis

Location	Number of Accidents	Accident Rate
South Hills Road – County Line to Highway 282	8	2.65
Holmes Gulch Road – Capitol Drive to Mule Trail	1	0.86
Capitol Drive – County Line to South Hills Road	2	2.31
Old State Highway 282 – South Hills Road to Jackson Creek Road	4	1.06
South Hills Drive – South Hills Road to County Line	2	30.75
Hill Brothers Road – Jackson Creek Road to End of Road	2	6.68

The accident rate values listed above are at or near average for each type of road segment with the exception of South Hills Drive. The South Hills Drive accident rate is significantly higher than other road segments within the study area. The high value is directly related to the short section of road and the low volume of traffic. There were only two accidents along this section of road in a five year time frame, this is not a significant number of accidents and further analysis is not warranted.

The majority of accidents reported in the study area were attributed to poor road conditions or were alcohol related incidents. One fatality was reported along Old State Highway 282. Implementation of the proposed improvements discussed in section 6 may help to reduce the accident rates in the study area.

5.6. Emergency Services

Concern has been raised about the response time for emergency service providers within the study area. The major problem associated with the response time is the overall condition of the roads. The emergency vehicles are carrying vital equipment that can be damaged easily when rough roads are encountered. Another problem contributing to the response time is the width of the roadways. Many roads in the study area have little or no shoulder and do not meet width requirements specified by the County Road Standards. These issues create a problem when the larger emergency service vehicles encounter oncoming traffic. The road conditions result in slower response times that could lead to wildfires spreading through the area. In the case of a health emergency, a quick response time could result in the difference between life and death. Many of the road condition issues listed above will be addressed by implementation of the recommended improvement projects.

5.7. Speeds

Traffic speed data was collected on select road segments within the study area to determine whether traffic was traveling at or near the posted speed limits. An average speed and 85th percentile speed was calculated from the data recorded. The 85th percentile speed is used to determine the recommended posted speed limit for a given roadway. Table 5-3 shows the average speeds and 85th percentile speeds for each road segment studied.

Table 5-3 - Traffic Speeds

Road Location	Average Speed (mph)	85th% Speed (mph)
South Hills Road (East of Holmes Gulch Road Intersection)	27	35
South Hills Road (Near Lime Kiln Road)	29	35
South Hills Drive (Near Lewis and Clark County Line)	18	28
Holmes Gulch Road (North of South Hills Road Intersection)	25	32
Holmes Gulch Road (South of South Hills Road Intersection)	22	32
Capitol Drive (North of Highway 282 Intersection)	25	33
Hill Brothers Road (West of Jackson Creek Road Intersection)	28	33
Old State Highway 282 (South of Capitol Drive Intersection)	54	62

The roads in the study area are currently signed at 25 mph with the exception of Old State Highway 282 which is signed at 70 mph. The average speed calculated for each roadway was at or below the posted speed limit with the exception of South Hills Road. The average speed on South Hills Road is two to four miles per hour over the posted speed limit. The 85th percentile speeds calculated were all above the posted speed limit with the exception of Old State Highway 282. The average traffic speed and 85th percentile speed calculated for Old State Highway 282 is significantly lower than the posted speed limit. As road improvements are constructed, the average travel speed may increase. Speed studies should be conducted to recommend signing changes as improvements are implemented.

5.8. Signing

A thorough inventory of the existing signs within the study area was conducted during the data collection process. The signs were evaluated in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) for size and placement. Each road segment was also studied to determine if new signs were necessary to improve safety or meet current standards.

The general condition and placement of most existing signs within the study area were in compliance with current traffic engineering standards. There are a few locations were new signs should be installed to improve safety or meet current standards. Signing recommendations are discussed further in Section **6.5,** Transportation System Management Improvements.

6. Recommended Improvements

6.1. County Road Standards

The Jefferson County Commission adopted Road Standards in August of 2005. The standards outline specific criteria that should be applied to all future road improvement projects in the County.

The County Road Standards specify that roads with an Average Daily Traffic (ADT) volume of 400 or greater must be hard surfaced with an approved material. Current ADT's on a portion of South Hills Road as well as Capitol Drive exceed this value and require hard surfacing. The projected traffic volumes displayed in Figure 3-6 estimate that by the year 2010 traffic volumes on the entire length of South Hills Road along with a portion of Holmes Gulch Road will exceed 400 ADT, and shall require a hard surfacing. Figure 3-7 represents projected traffic volumes for the year 2025. As shown by this figure, the majority of roads analyzed as part of this study are at or near 400 ADT by the year 2025 and warrant hard surfacing. Traffic volumes should be monitored periodically throughout the study area to determine whether significant traffic pattern changes have occurred due to growth and development. The County Roads Standards are included as an appendix to this document.

6.2. Right-of-Way Dedications

During the review of subdivision proposals or planning for land use changes, special consideration should be given to the dedication of Right-of-Way (ROW) for future road improvements and upgrades. Consideration should be given to the existing road conditions, horizontal and vertical alignment, intersection layout, and proposed new roadways. County Road Standards specify a 60 foot minimum ROW width for all roads. This width should be evaluated for all proposed transportation projects to ensure that there is sufficient land to construct future improvements. Allocating sufficient ROW in the development phase of a land use change will minimize the need to acquire ROW as roads are upgraded to meet future traffic demands. The suggested right-of-way dedications, based on road classifications, are as follows:

Major Collector - 120 feet
Minor Collector - 100 feet
Local Road - 60 feet

The recommended widths will ensure that future upgrades can be constructed within ROW limits and will minimize the need for additional right-of-way allocations.

The South Hills Road – Old State Highway 282 and the Holmes Gulch Road – Capitol Drive intersections will require improvements as traffic volumes escalate. When evaluating land use changes or development adjacent to these intersections, sufficient ROW should be acquired to allow for future expansion and improvements.

6.3. Committed Major Improvements

Currently there are two major projects scheduled for construction within the study area. The Montana Department of Transportation has programmed a project to construct a new interchange in the southern portion of Lewis and Clark County. The

"South Helena Interchange" project involves a new interchange on Interstate 15 with appropriate connections to Saddle Drive and Colonial/Capitol Drive. The project would improve and pave Capitol Drive from Old State Highway 282 to the County line (Colonial Drive). Curb and gutter will be extended on Colonial Drive to the Jefferson County line. This project is in the final design stages and is scheduled to start construction in late 2006 or 2007.

MDT has also programmed a project to improve and upgrade the Jackson Creek – Old State Highway 282 intersection. The project includes replacing the current 4-way stop controlled intersection with a single-lane roundabout. The project is in the design stage and is scheduled for construction in 2007.

6.4. Proposed Major Improvements

The proposed improvements were broken into two phases based on upgrades necessary to improve current road conditions as well as improvements required to accommodate future traffic volumes.

An estimated cost for each project has been provided for planning purposes. The costs are based on the current County Road Standards. The gravel road estimates include upgrades to the road base, grading and shaping, widening, and adding a gravel surface course at a cost of $90,000 per mile. The hard surface road estimates include road base improvements, a 3 inch asphalt mat, and a chip seal cover at a cost of $300,000 per mile. The estimates include minor drainage improvements and installation of approach culverts. Right-of way acquisition costs were not included in the estimates, however a 15 percent construction contingency and a 25 percent engineering/administration cost for design and management was incorporated into each estimate. All costs are based on 2006 dollars and assume that the projects will be constructed by a contractor and all materials purchased commercially. Should County crews and County material sources be utilized, the estimated costs may fluctuate slightly.

County Road Standards allow hard surfacing road improvements to include a double chip seal (double shot) or asphalt millings. Estimates for double shot and asphalt millings are $150,000 and $250,000 per mile respectively. Double shot and asphalt millings are typically only used on lower volume roadways with minimal truck traffic. These alternatives generally do not have the life expectancy of an asphalt mat and typically require more maintenance. The double shot and asphalt milling alternatives should only be used in special circumstances and a thorough evaluation of the roadway conducted to determine whether the options are cost effective. For estimating purposes, double shot and asphalt millings were not included.

Recommended Improvements to Accommodate Current Conditions

The following list is ranked in order of priority.

1. South Hills Road (Old State Highway 282 to North Quarry Road)

Problem: The road segment is exhibiting advanced signs of deterioration including washboarding, rutting, and major potholing.

Drainage is a contributing factor to the advanced deterioration as there are minimal drainage ditches adjacent to the road.

Recommendation: It is recommended that this section of South Hills Road be improved and paved to meet County Road Standards. The recommended improvements include flattening the vertical profile at the intersection with Old State Highway 282, widening the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, improving the road base course, and providing a hard driving surface with a minimum of 3 inches of asphalt pavement and chip sealing.

Estimated Cost: $190,000

2. South Hills Road (North Quarry Road to Holmes Gulch Road)

Problem: This section of South Hills Road is showing signs of deterioration and is in poor overall condition. The road has excessive potholes, major washboarding, and does not meet minimum width requirements specified by the County Road Standards.

Recommendation: It is recommended that this section of South Hills Road be upgraded to meet County Road Standards. The recommended improvements include regrading the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, and providing an aggregate road surfacing that is a minimum of 6 inches thick.

Estimated Cost: $55,000

3. Holmes Gulch Road (Capitol Drive to North Quarry Road)

Problem: This section of Holmes Gulch Road is in poor overall condition and in need of major improvements. The road exhibits severe washboarding and does not meet minimum width requirements specified by the County Road Standards. Portions of this road segment are hard surfaced, which is deteriorating beyond repair. Major potholes have developed in the hard surfacing sections.

Recommendation: It is recommended that this section of Holmes Gulch Road be improved and paved. The recommended improvements include widening the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, improving the road base course, and providing a hard driving surface with a minimum of 3 inches of asphalt pavement and chip sealing.

Estimated Cost: $160,000

4. South Hills Road (Holmes Gulch Road to End of Gravel)

Problem: This section of South Hills Road is in poor overall condition and in need of improvements. The road segment is showing advanced signs of deterioration including washboarding, rutting, and major potholing.

Recommendation: It is recommended that this section of South Hills Road be improved to meet County Road Standards. The recommended improvements include regrading the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, and providing an aggregate road surfacing that is a minimum of 6 inches thick.

Estimated Cost: $125,000

5. South Hills Road (Beginning of Pavement to Lewis and Clark County line)

Problem: This is a paved section of South Hills Road that exhibits signs of deterioration. Improvements are needed to extend the life of the pavement. Cracks and potholes are developing in many areas along the roadway. The road is currently paved to an average width of 20 feet along this segment.

Recommendation: It is recommended that this section of South Hills Road be widened and improved to comply with County Road Standards. The recommended pavement improvements include adding a thin structural overlay and chip sealing the pavement. The roadway should be widened to provide two 12-foot driving lanes and improvements made to the drainage ditches to improve runoff conveyance.

Estimated Cost: $110,000

6. Holmes Gulch Road (North Quarry Road to South Hills Road)

Problem: This section of Holmes Gulch Road is showing signs of deterioration and requires improvements to meet County Road Standards. The existing road does not meet minimum width requirements specified by the County Road Standards and is developing washboards and potholes in many areas along the roadway.

Recommendation: It is recommended that this section of Holmes Gulch Road be widened and improved. The recommended improvements include regrading the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, and providing an aggregate road surfacing that is a minimum of 6 inches thick.

Estimated Cost: $55,000

TOTAL MAJOR IMPROVEMENT COSTS = $695,000

The projects listed above are the highest priority projects within the study area and are required to improve and upgrade roads to meet current traffic volumes and conditions of the roads.

Two public/private roads were evaluated under this study as directed by the County Commission. The following is a brief description of the deficiencies observed with each road, recommended improvements, and an associated cost estimate.

South Hills Drive (South Hills Road to Lewis and Clark County line)

Problem: South Hills Drive is a steep, narrow roadway that does not meet road standards. This road section exhibits signs of deterioration and is in poor overall condition. The road has excessive potholes and does not meet minimum width requirements specified by the County Road Standards.

Recommendation: It is recommended that this section of South Hills Drive be improved to minimize safety issues. The recommended improvements include regrading the roadway to improve the horizontal and vertical profile and provide two 12-foot driving lanes, improving drainage ditches, and providing an aggregate road surfacing that is a minimum of 6 inches thick.

Estimated Cost: $95,000

North Quarry Road (Holmes Gulch Road to South Hills Road)

Problem: This section of North Quarry Road is showing signs of deterioration and requires improvements to meet current road standards. The existing road is developing washboards and potholes in many areas along the roadway.

Recommendation: It is recommended that this section of roadway be widened and improved. The recommended improvements include regrading the roadway to provide two 12-foot driving lanes, improving drainage ditches, adding culverts at approach roads, and providing an aggregate road surfacing that is a minimum of 6 inches thick.

Estimated Cost: $30,000

Projects recommended for improvement based on current conditions are displayed in Figure 6-1 and outlined in Table 6-1.

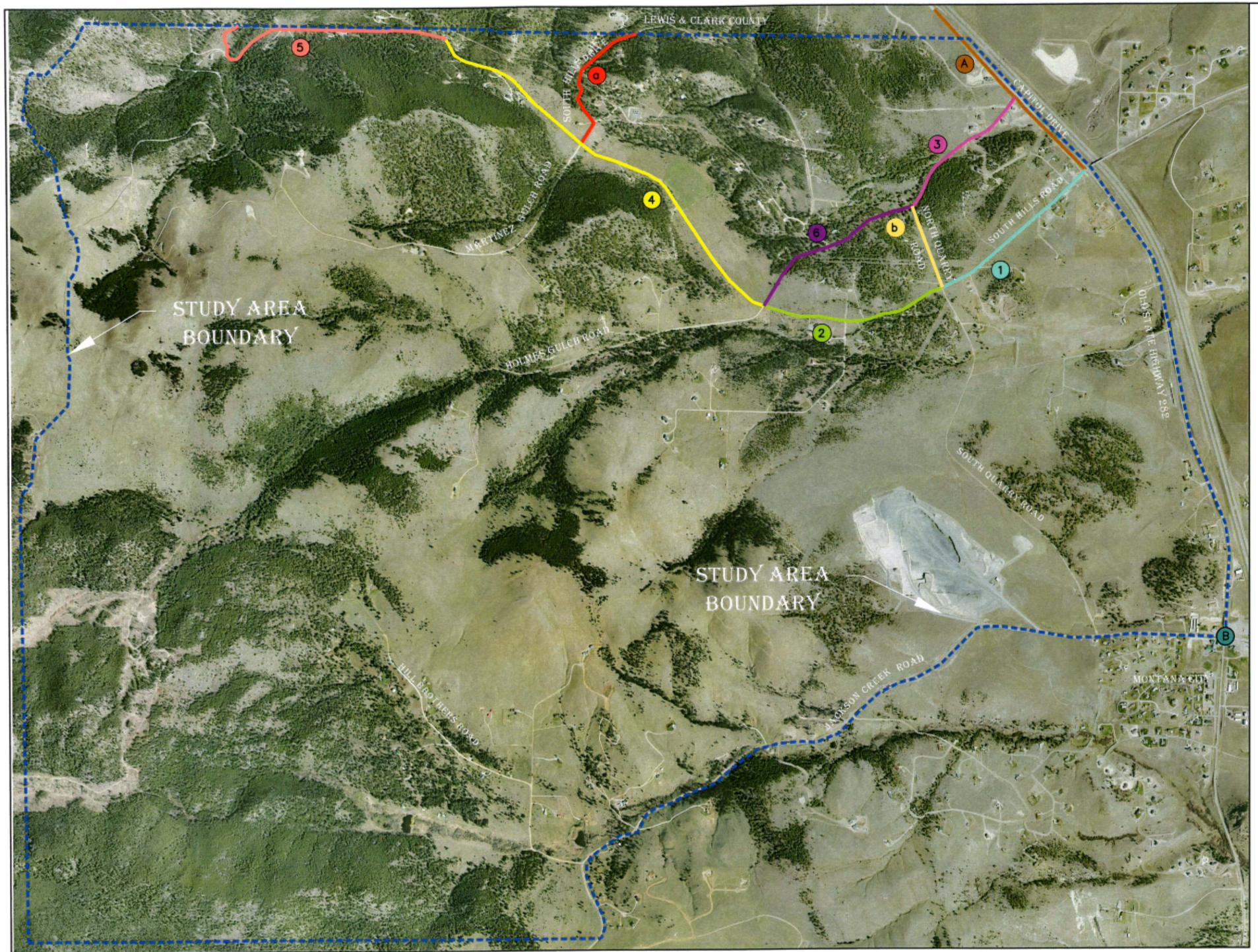
Table 6-1 – Recommended Improvements to Accommodate current conditions

Project	Recommended Improvement	Cost
South Hills Road (Old State Highway 282 to North Quarry Road)	Base improvements & Hard Surfacing	$190,000
South Hills Road (North Quarry Road to Holmes Gulch Road)	Base improvements & Graveling	$55,000
Holmes Gulch Road (Capitol Drive to North Quarry Road)	Base improvements & Hard Surfacing	$160,000
South Hills Road (Holmes Gulch Road to End of Gravel)	Base improvements & Graveling	$125,000
South Hills Road (Pavement to L&C County Line)	Pavement Improvements	$110,000
Holmes Gulch Road (North Quarry Road to South Hills Road)	Base improvements & Graveling	$55,000
	Total =	**$695,000**
South Hills Drive (South Hills Road to L&C County Line)	Base improvements & Graveling	$95,000
North Quarry Road (Holmes Gulch Road to South Hills Road)	Base improvements & Graveling	$30,000

Recommended Improvements to Accommodate Future Traffic Volumes

The existing road network was analyzed using future traffic forecasts to evaluate improvements and upgrades necessary to alleviate future traffic capacity and safety concerns. Figure 3-7 represents projected traffic volumes for the year 2025. As shown by this figure, the majority of roads analyzed under this study are at or near 400 ADT by the year 2025 and warrant hard surfacing. Additionally, the intersections at South Hills Road – Old State Highway 282 and the Holmes Gulch Road – Capitol Drive decrease in overall condition to LOS F by the year 2025. To meet future traffic capacity demands, these intersections will require upgrades and enhancements to improve traffic movement. Upgrades may involve expanding the intersections with additional through lanes and or turning lanes, or controlling traffic with either a roundabout or a signalized intersection. Widening of Old State Highway 282 should be addressed as traffic volumes increase along this section of roadway. This section of road is currently a two-lane facility with minimal shoulders and out-slopes. As traffic volumes increase, widening the roadway to include shoulders will enhance safety.

Table 6-2 outlines the recommended projects necessary to accommodate future capacity and safety concerns. The projects and costs assume that previous improvement recommendations were implemented and maintained. For the purpose of estimating costs, a signalized intersection was included as the intersection upgrade alternative.



COMMITTED MAJOR IMPROVEMENTS

- A — SOUTH HELENA INTERCHANGE
- B — JACKSON CREEK ROAD–OLD STATE HIGHWAY 282 ROUNDABOUT

PROPOSED MAJOR IMPROVEMENTS

- 1 — SOUTH HILLS ROAD (STATE HIGHWAY 282 TO SOUTH QUARRY ROAD)
- 2 — SOUTH HILLS ROAD (SOUTH QUARRY ROAD TO HOLMES GULCH ROAD)
- 3 — HOLMES GULCH ROAD (CAPITOL DRIVE TO NORTH QUARRY ROAD)
- 4 — SOUTH HILLS ROAD (HOLMES GULCH ROAD TO END OF GRAVEL)
- 5 — SOUTH HILLS ROAD (BEGINNING OF PAVEMENT TO LEWIS & CLARK COUNTY LINE)
- 6 — HOLMES GULCH ROAD (NORTH QUARRY ROAD TO SOUTH HILLS ROAD)
- a — SOUTH HILLS DRIVE (SOUTH HILLS ROAD TO LEWIS & CLARK COUNTY LINE)
- b — NORTH QUARRY ROAD (HOLMES GULCH ROAD TO SOUTH HILLS ROAD)

Northern Jefferson County Transportation Infrastructure Study

Great West Engineering
February 2006

SCALE: 1" = 1760'

FIGURE 6-1
PROPOSED TRANSPORTATION IMPROVEMENTS

Table 6-2 – Recommended Improvements to Accommodate Future (2025) Traffic Volumes

Project	Recommended Improvement	Cost
South Hills Road – Old State Highway 282 Intersection	Signalized Intersection	$150,000
Holmes Gulch Road – Capitol Drive Intersection	Signalized Intersection	$120,000
South Hills Road (North Quarry Road to End of Gravel)	Hard Surfacing	$435,000
Holmes Gulch Road (North Quarry Road to Mule Trail)	Hard Surfacing	$325,000
Hill Brothers Road (End of Road to Jackson Creek Road)	Hard Surfacing	$220,000
Old State Highway 282 (Jackson Creek Road to South Hills Road)	Widening	$235,000
	Total =	**$1,485,000**

The County should evaluate both current and future conditions when recommending implementation of a project. A proactive approach, and often times a cost savings measure, would involve upgrading the current recommended projects to meet future demands. This will result in higher upfront costs, but would eliminate the need to construct multiple improvements over the planning period. This study should be revisited regular basis in order to acknowledge the effects of projects as they are implemented and evaluate significant changes to planning parameters.

6.5. Proposed Transportation System Management (TSM) Improvements

Transportation System Management (TSM) improvements are relatively low cost projects that enhance current transportation facilities. TSM projects can improve the overall condition of a road, improve the level of service, and improve safety. These projects are relatively small projects that can often be implemented by County personnel. Typical TSM projects that will improve transportation facilities within the study area include signing and road maintenance. These low cost improvements are discussed further in the following sections:

Signing: The general condition and placement of most existing signs within the study area are in compliance with current Manual of Uniform Traffic Control Devices (MUTCD) standards. The MUTCD sets guidelines for the location and placement of signs as well as the overall size and height. The following list delineates the recommended signing improvements for study area.

Stops Signs:

- Holmes Gulch Road at Capitol Drive
- Holmes Gulch Road at South Hills Road
- South Hills Drive at South Hills Road

Speed Limit Signs:

- 25 mph sign for East and West bound traffic on Holmes Gulch Road between Capitol Drive and South Hills Road
- 25 mph sign on South Hills Road entering Jefferson County

Street Name Signs:

- Street name sign at the Holmes Gulch Road – Capitol Drive intersection
- Street name sign at the Holmes Gulch Road – South Hills Road intersection

Estimated Signing Cost: $5,000

Road Maintenance: Road maintenance is an ongoing process that should be incorporated into all road systems. Routine maintenance can improve the overall road condition, improve safety, and extend the life of the road. Routine gravel road maintenance practices should include the following:

- Road grading and shaping
- Drainage ditch maintenance
- Base course improvements
- Applying gravel as needed
- Dust control
- Brush and weed control

Routine pavement maintenance activities should include the following:

- Crack repair
- Chip sealing
- Structural overlays
- Minor subgrade repair
- Striping
- Brush and weed control

The recommended TSM's should be implemented on all proposed improvement projects to upgrade the overall condition of the roads, extend the life of the roads, and improve safety within the study area.

6.6. Pedestrian and Bicycle Recommendations

The non-motorized transportation improvements recommended by this study are intended to provide an interconnected trail system that enables pedestrian and bicycle traffic to access the recreational opportunities offered by this region in a safe and efficient manner. The following recommendations will not only bolster the pedestrian and bicycle infrastructure, but will enhance overall traffic flow by reducing congestion on collectors within the study area. The planning level estimates assume the trails projects will be constructed within existing County right-of-way and no additional right-of-way will need to be purchased. As road projects are implemented throughout the study area, special consideration should be taken to incorporate the recommended trail projects within County right-of-way. This may be accomplished by shifting the roadways to one side of the right-of-way to allow for future trails projects.

1. South Hills Road (County Line to Old State Highway 282)

Problem: Pedestrian and bicycle traffic currently share the existing road with motorized traffic. The road does not have adequate shoulder width to accommodate this use and presents inherent safety concerns.

Recommendation: It is recommended that a pedestrian path be constructed adjacent to the existing road. The path would be available to bicycle traffic, but may not meet all AASHTO code requirements for bicycle paths. The path should be constructed with an 8-foot top width and surfaced with a minimum of 3-inches of crushed gravel road base. Miscellaneous drainage improvements will be necessary. It is assumed that the pedestrian path would be constructed within existing County right-of-way.

Estimated Cost: $145,000

2. Old State Highway 282 (Jackson Creek Road to South Hills Road)

Problem: Pedestrian and bicycle traffic currently share the existing road with

motorized traffic. The road does not have adequate shoulder width to accommodate this use and presents inherent safety concerns. The existing non-motorized use also increases congestion on a major collector roadway with high traffic volumes and travel speeds.

Recommendation: It is recommended that a pedestrian path be constructed adjacent to the existing road. The path would be available to bicycle traffic, but may not meet all AASHTO code requirements for bicycle paths. The path should be constructed with an 8-foot top width and surfaced with a minimum of 3-inches of crushed gravel road base. Miscellaneous drainage improvements will be necessary. It is assumed that the pedestrian path would be constructed within existing County right-of-way.

Estimated Cost: $95,000

3. Capitol Drive (South Hills Road to County Line/Colonial Drive)

Problem: Capitol Drive will be widened and paved incidental to the construction of the South Helena Interchange project. The project also involves the construction of concrete sidewalks north of the County line. Pedestrian and bicycle traffic utilizing the sidewalks would be forced to share the existing road with motorized traffic once they enter Jefferson County. The proposed road does not have adequate shoulder width to accommodate this use and presents inherent safety concerns.

Recommendation: It is recommended that a pedestrian path be constructed adjacent to the Capitol Drive following the proposed road improvements. The path would be available to bicycle traffic, but may not meet all AASHTO code requirements for bicycle paths. The path should be constructed with an 8-foot top width and surfaced with a minimum of 3-inches of crushed gravel road base. Miscellaneous drainage improvements will be necessary. It is assumed that the pedestrian path would be constructed within existing County right-of-way.

Estimated Cost: $55,000

4. Jackson Creek Road (Old State Highway 282 to Study Area Boundary)

Problem: Pedestrian and bicycle traffic currently share the existing road with motorized traffic. The road does not have adequate shoulder width to accommodate this use and presents inherent safety concerns. The existing non-motorized use also increases congestion on a major collector roadway with high traffic volumes. The areas served by Jackson Creek Road are prime for residential development and will undoubtedly see significant increases in daily traffic volumes throughout the next decade and beyond.

Recommendation: It is recommended that a pedestrian path be constructed adjacent to the existing road. The path would be available to bicycle traffic, but may not meet all AASHTO code requirements for bicycle paths. The path should be constructed with an 8-foot top width and surfaced with a minimum of 3-inches of crushed gravel road base. Miscellaneous drainage improvements will be necessary. It is assumed that the pedestrian path would be constructed within existing County right-of-way.

Estimated Cost: $130,000

The estimated costs for the pedestrian and bicycle trail projects listed above include an average trail width of 8 feet and a 3-inch crushed gravel road base. The 3-inch gravel road base does not meet current ADA requirements for pedestrian and bike trails. ADA requires all non motorized trails to include a non slip hard surfacing. This surfacing may include concrete, pavement, compacted cold millings, or double shot. To accommodate ADA requirements for the recommended trail projects, the estimated cost would be approximately 2.5 times higher than the costs shown above. As these trail projects are implemented, each one should be evaluated to determine whether meeting ADA requirements is warranted and the increase in cost can be justified.

During the implementation of future pedestrian/bicycle trail projects, continuity with trail systems in adjacent areas should be considered. In particular, the proposed trail system adjacent to Capitol Drive, Old State Highway 282, and Jackson Creek Road should be constructed to tie into the pedestrian facilities proposed under the South Helena interchange and Montana City roundabout projects. The development of a well connected, safe trail system will encourage non-motorized travel throughout the study area and adjacent neighborhoods.

7. Financial Analysis

7.1. Background

The intent of this chapter is to identify potential funding sources that can be tapped to finance the transportation system improvements identified in previous chapters of this study. Historically, road improvements in the study area have been financed out of the County's general road fund. The majority of the federal and state funding programs are intended for improvements to the interstate and state highway systems; thus, most roads evaluated by this study are not eligible. Bearing this in mind, there are still a variety of funding mechanisms available to the County that can be applied to transportation improvement projects outside of those on state maintained roads.

With the exception of the local funding alternatives, the information relating to federal and state funding programs was assembled with the aid of the Statewide and Urban Planning Section of the Montana Department of Transportation. The Statewide and Urban Planning Section maintains a comprehensive list of funding sources, associated eligibility criteria, required matching funds, and the agency(s) responsible for overseeing administration of the funds. The funding mechanisms discussed in the following sections outline common funding sources applicable to transportation improvement projects in rural areas.

7.2. Federal Funding Sources

The funding sources discussed in this section reflect monies allocated to the State under the Transportation Equity Act for the 21st Century (TEA-21). The TEA-21 funding authorization has since expired and the Safe, Accountable, Flexible, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) funding authorization was signed into law on August 10, 2005. SAFETEA-LU differs from TEA-21 in several areas, many of which are still being evaluated by MDT at this juncture; however, the funding mechanisms presented in this section are included in the new transportation bill.

CTEP – Community Transportation Enhancement Program

Federal funds available under this unique Montana program are used to finance transportation projects that enhance the present surface transportation system in accordance with the Federal requirement that 10% of the STP funds each state receives must be spent on projects in the following categories:

- Pedestrian and Bicycle facilities
- Acquisition of scenic easements and historic or scenic sites
- Scenic or historic highway programs
- Landscaping and other scenic beautification
- Rehabilitation and operation of historic transportation buildings, structures or facilities (including railroads)
- Historic preservation
- Archaeological planning and research
- Mitigation of water pollution due to highway runoff

- Preservation of abandoned railway corridors (including the conversion and use for pedestrian or bicycle trails)
- Control and removal of outdoor advertising
- Safety education activities for pedestrians and bicyclists e Establishment of transportation museums
- Projects that reduce vehicle-caused wildlife mortality

The Federal share for CTEP projects/activities is 86.58% with a required local match of 13.42%. Eligible local and tribal governments select the projects. Jefferson County is allocated about $47,000 annually (total dollars, federal plus local match based on FFY 2004 allocation).

STPHS – Surface Transportation Program – Hazard Elimination

The purpose of the Federal Hazard Elimination Program is to identify hazardous locations throughout the states highway system, assign benefit/cost ratio priorities for the correction of these hazards, and implement a schedule of projects for their improvements. Hazard Elimination projects are funded with 90% Federal funds and 10% State funds.

Projects eligible for funding under the Hazard Elimination Program include any safety improvement project on any public road; any public surface transportation facility or any publicly owned bicycle or pedestrian pathway or trail; or any traffic calming measure. MDTs Traffic & Safety Bureau selects the projects by identifying high hazard sites through the analysis of law enforcement accident reports. Sites with a cluster of accidents over time are field reviewed and an appropriate type of corrective action is determined. The cost of the proposed Hazard Elimination project is compared to the potential benefit of the action. Once the benefit/cost ratio is calculated for all high hazard sites statewide, the projects are prioritized from highest to lowest and the projects are funded in this order until the yearly funds are exhausted.

7.3. State Funding Sources

The State offers two funding programs that may provide alternative financing for some projects recommended by this study. The details of each program are discussed below.

SFC – State Funded Construction

The Pavement Preservation Program funds construction projects with State funds. Projects not eligible for Federal funding participation are funded with these funds. The program funds projects on the Primary and Secondary Highway Systems to preserve the condition and extend the service life of the pavement. The type of work consists entirely of overlays and/or seal and covers. Eligibility requirements are that the highway be maintained by the State. The Transportation Commission establishes the priorities for the program. This program is totally State funded, requiring no match. MDT staff nominates the projects based on pavement preservation needs.

State Fuel Tax – City and County

Montana assesses a tax of $.27 per gallon on gasoline and diesel fuel used for transportation purposes. Each incorporated city and town receives a portion of the total

tax funds allocated to cities and towns based on:

1. The ratio of the population within each city and town to the total population in all cities and towns in the State.
2. The ratio of the street mileage within each city and town to the total street mileage in all incorporated cities and towns in the State. The street mileage is exclusive of the Federal-Aid Interstate and Primary Systems.

Each County receives a percentage of the total tax funds allocated to counties based on:

1. The ratio of the rural population of each County to the total rural population in the state, excluding the population of all incorporated cities or towns within the County and state.
2. The ratio of the rural road mileage in each County to the total rural road mileage in the state, less the certified mileage of all cities or towns within the County and state.
3. The ratio of the land area in each County to the total land area of the state.

All fuel tax funds allocated to the city and County governments must be used for the construction, reconstruction, maintenance, and repair of rural roads or city streets and alleys. The funds may also be used for the share that the city or county might otherwise expend for proportionate matching of Federal funds allocated for the construction of roads or streets on the Primary, Secondary, or Urban Systems.

Priorities for the use of these funds are established by the cities and counties receiving them.

For State Fiscal Year 2005, Jefferson County received $93,000 in state fuel tax funds. The amount varies annually, but the current level provides a reasonable base for projection throughout the planning period.

7.4. Local Funding Sources

Counties have numerous alternatives available to generate funds for road improvement projects. The various financing options and their intended uses are discussed in the following sections.

Road Fund

The Road Fund is intended for the construction and maintenance of all County-maintained roads. The road fund is typically financed through allocations from other County funds, such as a local vehicle option tax and state gas tax revenues. The road fund is also supported by a mill levy assessed on property tax statements. The road fund is currently limited to a maximum of 14.5 mills. Currently, Jefferson County receives approximately $93,000 per year from the state gas tax apportionment.

Due to fiscal constraints, the road fund is typically used for maintenance activities with very little emphasis placed on new road improvement projects. As the roads within the study area are but a fraction of the overall quantity of County maintained roads, local road improvement projects are forced to compete for funding with projects in other areas of the County. It is unlikely that the

road fund could bear the cost of a large road improvement project without supplemental financing.

Bridge Fund

The Bridge Fund allocates money for the design, construction and maintenance of all structures located on off-system roads. Off-system roads are typically defined as those not on the interstate or state highway system. As with the road fund, the bridge fund is typically financed through transfers from other County funds as well as through mills levied against property tax statements. County bridge mills are incidental to the overall 80-mill ceiling and are adjusted on an annual basis. Currently, the County is assessing a 3.5-mill levy.

Special Revenue Funds

Special revenue funds are utilized to allocate monies that are legally restricted to distinct applications. A variety of common transportation-related funds are discussed in the following sections.

Capital Improvement Fund. Capital improvement funds are a common mechanism for funding major road improvement projects. However, they can be used to fund a variety of County infrastructure projects. These accounts are typically financed through loans from other County funds and must be paid off within ten years.

Rural Improvement District (RID)/Rural Maintenance District (RMD). Rural Improvement Districts are commonly implemented to finance infrastructure improvements that benefit the residents of a specific area. RID's are administered by the County and are typically constructed by private contractors. Revenues for RID's are generated through the sale of bonds or warrants, the costs of which are repaid through assessments placed on the property tax statements of land owners in the district. Transportation projects eligible for construction through the RID process include road improvement, sidewalk and pedestrian/bicycle path construction, installation of curb & gutter, drainage improvements, etc.

Rural Maintenance Districts are typically formed in conjunction with an RID as a means of generating on-going revenue for the maintenance of the improvement project. Transportation-related RMD's are commonly used to finance the regular grading, plowing and gravelling of roads not maintained by the County.

Special Bond Funds

Special bond funds may be used to finance large, capital-intensive projects that are not eligible for other funding. The special bond must be authorized by the voters prior to issuance. The bonds may be repaid through a variety of mechanisms, the most common being an assessment on property tax statements.

7.5. Private Funding Sources

Private financing of road improvement projects has become an increasingly common funding mechanism in recent years. Commercial and residential developers realize that infrastructure improvements which improve access to their investment are often profitable measures. Several private funding alternatives applicable to the study area are discussed below.

Developer Financing
Developer (development) financing often involves the donation of land for current or future transportation improvements. The cost of the intended improvements would be the responsibility of the local government.

Cost Share
Cost share involves the participation of the private sector in the construction and maintenance of infrastructure improvement projects. The projects are typically initiated through the construction of a new commercial or residential development.

Private Donation
Private donations are typically used to off-set potentially negative impacts resulting from the development of commercial or residential property. Donations are often in the form of cash or property, similar to development financing.

General Obligation Bonds
General obligation (G.O.) bonds may be sold in order to fund major transportation infrastructure improvement projects. G.O. bonds are intended for a specific purpose and require voter approval prior to issuing. This financing mechanism is intended to generate revenue for initial construction, with public debt being relieved once the bond is retired.

Development Exactions and Impact Fees
Exactions and impact fees are an increasingly common means of generating funds for transportation infrastructure improvements through the levying of fees against developers. They allow the growth generated by new development to finance itself rather than placing the burden for road improvements upon the general public.

The implementation of an exaction or impact fee program must be thoroughly researched in order to establish an equitable fee structure that is fair assessed. For instance, average daily traffic generated by the new development could be used in evaluating the impact a new subdivision would have upon the transportation system.

7.6. Implementation Strategies

Securing the necessary funding to finance large transportation infrastructure projects is a problem common to many counties throughout Montana. The road inventory conducted incidental to this study suggests that the roads throughout the study area are in need of maintenance and, in some instances, substantial improvements. The County road department, at current funding levels, is unable to keep pace with increased demands for maintenance and improvement projects. In order maximize the number of recommended projects constructed during the planning period, the County will need to evaluate alternative funding mechanisms and maximize revenues generated from road mills, motor vehicle taxes, and the state gas tax apportionment.

The acquisition and preservation of roadway corridors and rights-of way often present a great deal of difficulty in planning and implementing transportation infrastructure improvement projects. Given the rural nature of the region and the geographic barriers present throughout the study area, it is unlikely that either of these issues will

become an obstacle in the future. Old State Highway 282 and Capitol Drive provide an adequate north-south collector system that is capable of accommodating additional traffic generated by commuters to and from the Montana City and Clancy areas. South Hills Road is capable of functioning as the east-west collector when one considers that traffic will largely consist of local residents. Future construction in the area will likely be limited to local roads where rights-of-way can be set aside during the subdivision review process.

The County should give strong consideration to the various alternative funding sources outlined earlier in this section. In particular, the implementation of rural improvement districts (RID) and rural maintenance districts (RMD) should be seriously evaluated. RID's are a commonly accepted means of generating revenue necessary to undertake transportation infrastructure improvement projects that are too costly to finance through the county road fund. Improvements financed through RID's typically serve a local road system with a small percentage of traffic generated outside of the district boundaries. With the exception of Old State Highway 282 and Capitol Drive, local residents generate the majority of the traffic on the roads within the study area. This would be an excellent mechanism for funding nearly all of the improvements recommended for South Hills Road and Holmes Gulch Road. RMD's are typically implemented in conjunction with an RID as a means of generating on-going revenue necessary to properly maintain the infrastructure created under the RID.

The County currently receives $47,000 annually from the Community Transportation Enhancement Program (CTEP) administered by MDT. The CTEP funds are an excellent source of revenue for non-motorized vehicle improvement projects and could be leveraged against other public and private funding sources to maximize their value. However, CTEP financed projects must meet ADA requirements, which can dramatically increase construction costs.

Developer financing and cost sharing should be evaluated when reviewing applications for new subdivisions within the study area. The County and developer will both benefit from improved safety and access to the proposed subdivisions. It is also reasonable to expect the developer to participate in road improvement projects resulting from the proposed subdivision.

It is suggested that the County review the recommendations set forth by this study on a regular basis to evaluate and reprioritize the projects. Periodic adjustments are often necessary to reflect fluctuations in county finances, changes in land use, and impacts from transportation infrastructure improvements in adjacent areas.

Funding Strategy

The development of a Capital Improvement Plan (CIP) for transportation infrastructure improvements is highly suggested. CIP's identify the County's immediate needs and analyze the available funding sources for each project. Immediate needs can range from road improvements and equipment acquisition to building remodels, depending upon the scope of the CIP. The CIP serves as link between

the County's finances and investment needs, and is an important instrument for future planning.

Private funding sources are a viable source of financing for many of the recommended improvements outlined in Section 6 of this study. The County should evaluate each project and identify potential beneficiaries within the private sector. Beneficiaries may include developers and land owners adjacent to the projects as well as commercial interests such as the Ashgrove Cement quarry in the southeast corner of the study area.

The County should investigate potential sources of matching funds as well. The availability of matching funds for a specific infrastructure improvement project may lead to a higher or lower prioritization during the next review period. Obviously, projects with available matching funds would be given stronger consideration during future planning discussions.

The County must clearly identify the highest priority transportation infrastructure improvement projects and develop a funding plan to address their implementation. At present, the following projects should receive the highest priority:

Recommended Improvements Projects
(Shown in order of priority)

1. **South Hills Road (Old State Highway 282 to North Quarry Road)**
Reconstruct and pave this section of roadway to meet County Road Standards.

2. **South Hills Road (North Quarry Road to Holmes Gulch Road)**
Reconstruct and improve this gravel section of South Hills Road to meet County Road Standards.

3. **Holmes Gulch Road (Capitol Drive to North Quarry Road)**
Reconstruct and pave this section of roadway to meet County Road Standards.

4. **South Hills Road (Holmes Gulch Road to End of Gravel)**
Reconstruct and improve this gravel section of South Hills Road to meet County Road Standards.

5. **South Hills Road (Beginning of Pavement to Lewis and Clark County line)**
Widen roadway to meet County Road Standards and improve condition of pavement.

6. **Holmes Gulch Road (North Quarry Road to South Hills Road)**
Reconstruct and improve this gravel section of roadway to meet County Road Standards.

A summary of the recommended improvement projects as well as potential funding sources is provided in Table 7-1.

Table 7-1 - Proposed Improvements Cost Estimate

Proposed Projects	Estimated Cost	State	Local	Private
South Hills Road (Old State Highway 282 to North Quarry Road)	$190,000	✓	✓	✓
South Hills Road (North Quarry Road to Holmes Gulch Road)	$55,000	✓	✓	✓
Holmes Gulch Road (Capitol Drive to North Quarry Road)	$160,000	✓	✓	✓
South Hills Road (Holmes Gulch Road to End of Gravel)	$125,000	✓	✓	✓
South Hills Road (Beginning of Pavement to L & C County Line)	$110,000	✓	✓	✓
Holmes Gulch Road (North Quarry Road to South Hills Road)	$55,000	✓	✓	✓